



**Environmental Assessment  
And Finding of No Significant Impact  
For the  
Low Impact Development Retrofit  
At Pillar Point Air Force Station,  
California**

**9 January 2012**

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## FINDING OF NO SIGNIFICANT IMPACT

### ENVIRONMENTAL ASSESSMENT FOR THE LOW IMPACT DEVELOPMENT RETROFIT AT PILLAR POINT AIR FORCE STATION, CALIFORNIA

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with the Low Impact Development (LID) retrofit of Pillar Point Air Force Station (AFS). LID is a method for eliminating pollutants in storm water through natural processes and by attempting to maintain pre-development hydrologic characteristics, such as flow patterns, surface retention, and recharge rates. This EA was prepared in accordance with all applicable federal, state, and local laws and regulations including the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321, *et seq.*); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508); and Title 32 CFR Part 989, *Environmental Impact Analysis Process (ELAP)*. The 30th Space Wing is representing the Department of Defense (DoD) as the lead agency.

Pillar Point AFS is located on the central California coast, approximately 20 miles south of San Francisco on a coastal peninsula near Half Moon Bay. Pillar Point AFS is a tracking station to support polar orbiting space satellite and operational intercontinental ballistic missile launches from Vandenberg Air Force Base (AFB).

The State Water Resources Control Board (SWRCB) notified Vandenberg AFB on 21 October 2004, alleging a violation of the California Ocean Plan (COP), arising from discharge of storm water into an Area of Special Biological Significance (ASBS) (the James V. Fitzgerald Marine Reserve located in San Mateo County) from Pillar Point AFS. The ASBS nearly borders Pillar Point AFS on all sides, except for Pillar Point Harbor which is not part of the ASBS. The SWRCB notification requested Vandenberg AFB to cease the discharge or file a request of exception to the COP prohibition. The 30th Space Wing's Environmental Quality Office (30 CES/CEANQ) submitted an application to the SWRCB for an exception to the COP prohibition, in order to comply with the SWRCB's timeline. The Air Force seeks to implement the Proposed Action to improve runoff water quality and make progress towards restoring natural water quality conditions in a manner consistent with federal and state goals and objectives.

Based upon a review of the site; estimated storm water flow volumes and rates; meetings with stakeholders (regulatory and non-regulatory) including SWRCB and the California Coastal Commission; and an evaluation of water quality treatment opportunities; multiple storm water discharge alternatives were assessed and evaluated. Retrofitting the site using LID techniques and continuing to discharge runoff to the ASBS via an existing concrete channel was selected as the most feasible alternative and most effective approach to addressing storm water discharge quality and quantity concerns. The Proposed Action would provide improved effluent quality, acceptable recurring costs, and minimal impacts on aesthetics, cultural resources, and receiving waters. Coupled with an exception to the COP prohibition, the Proposed Action would support compliance with the COP.

#### DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Proposed Action would utilize LID techniques enabling greater on-site infiltration of storm water, that has the added benefit of improved water quality. The Proposed Action consists of (1) replacing a portion of an existing concrete v-ditch, located immediately to the south of the primary industrial

## ***Finding of No Significant Impact***

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facilities, with a series of vegetated bioretention cells and (2) installing two bioretention cells between Buildings 1 and 10 to promote infiltration of storm water runoff from adjacent impervious areas.

Alternative 1 would be the same as the Proposed Action, but would divert the discharge to Pillar Point Harbor indirectly via Princeton Marsh. Under Alternative 1, the bioretention cells would be installed and runoff would be directed to an existing channel that parallels West Point Avenue. At various points along this channel, runoff would be diverted under West Point Avenue through existing culverts to existing vegetated slopes and swales that are hydraulically connected to the Princeton Marsh. Portions of runoff not conveyed under West Point Avenue would continue flowing downhill in an easterly direction and into an existing downstream asphalt channel that terminates at Princeton Marsh (the easternmost discharge point). The concrete and asphalt channel along West Point Avenue would be improved where necessary to meet capacity, as well as the culvert leading from West Point Avenue to the east end of Princeton Marsh. Ultimately, the flow would discharge to Pillar Point Harbor, but only indirectly through Princeton Marsh. In Alternative 1, the corrugated metal pipe that currently conveys storm water to the ASBS, would be completely blocked, thus "ceasing" direct discharge to the ASBS.

Under the No-Action Alternative, no action would be taken to eliminate the discharge to the ASBS. All existing drainages and culverts would be cleaned to allow full capacity.

### **SUMMARY OF THE ANTICIPATED ENVIRONMENTAL IMPACTS**

This EA evaluates the potential effects of the Proposed Action, Alternative 1, and the No-Action Alternative with respect to the following issue areas: air quality; cultural resources; environmental justice; geology and soils; hazardous materials and waste management; land use; natural resources; noise; police, fire, and emergency services; safety and occupational health; socioeconomic factors; solid waste; traffic and transportation; utilities; and water resources as well as cumulative impacts. With implementation of Best Management Practices, the Proposed Action would have either no impact or less than significant impacts on these resources according to the EA.

Under Alternative 1, storm water discharges into the ASBS would be eliminated and Alternative 1 would result in a greater reduction in pollutant loads entering the ocean by routing storm water through Princeton Marsh. However, Alternative 1 would have unknown, potentially significant impacts on cultural resources due to repairs of the drainage system along West Point Avenue. Impacts would potentially be unmitigable, which would require preparation of an Environmental Impact Statement. Alternative 1 also would have unknown construction impacts on several federally listed species and unknown long-term impacts on the conductivity and hydraulics of Princeton Marsh which would require further study.

Under the No-Action Alternative, storm water would continue to be discharged to the ASBS. The storm water discharge could result in deleterious effects on marine life that occur offshore of the storm water outfall. Therefore, the No-Action Alternative would have greater impacts on water quality, natural resources, and land use than the Proposed Action or Alternative 1.

## FINDINGS AND CONCLUSION

Following a review of the EA, I find that the proposed Low Impact Development Retrofit of Pillar Point Air Force Station would not result in significant environmental impacts. Based upon the information contained within this assessment, a Finding of No Significant Impact is made. The preparation of an Environmental Impact Statement is not required for this action.

The Draft EA for the Low Impact Development Retrofit of Pillar Point Air Force Station was available for public review for 30 days from 28 June 2010 to 29 July 2010. The Final EA and response to public comments are available at the following location:

Asset Management Flight, Comprehensive Planning  
30 CES/CEAOP  
1028 Iceland Avenue  
Vandenberg AFB, California 93437-6010  
ATTN: Dina M. Ryan

## FINDING OF NO SIGNIFICANT IMPACT

In conjunction with the Environmental Assessment for the Low Impact Development Retrofit of Pillar Point Air Force Station, California

## APPROVAL:



NINA M. ARMAGNO, Colonel, USAF  
Commander, 30th Space Wing

29 Jan 12

Date

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**Environmental Assessment  
And Finding of No Significant Impact  
For the  
Low Impact Development Retrofit  
At Pillar Point Air Force Station,  
California**

Prepared for:

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1028 Iceland Avenue  
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9 January 2012

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## **1.0 PURPOSE AND NEED**

### **1.1 INTRODUCTION**

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with the Low Impact Development (LID) retrofit of Pillar Point Air Force Station (AFS). LID is a method for eliminating pollutants in storm water through natural processes and by maintaining pre-development hydrologic characteristics, such as flow patterns, surface retention, and recharge rates. This EA was prepared in accordance with all applicable federal, state, and local laws and regulations including the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321, *et seq.*); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508); and Title 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. The 30th Space Wing is representing the Department of Defense (DoD) as the lead agency.

### **1.2 LOCATION OF PROPOSED ACTION**

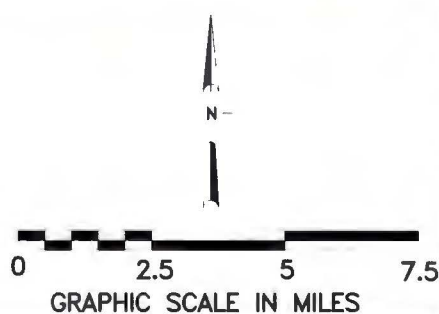
Pillar Point AFS is located on the central California coast, approximately 20 miles south of San Francisco (Figure 1-1). The station, which covers approximately 46 acres, is positioned on a coastal peninsula near Half Moon Bay. Pillar Point AFS is a tracking station that supports polar orbiting space satellite and operational intercontinental ballistic missile launches from Vandenberg Air Force Base (AFB). The 30th Space Wing, headquartered at Vandenberg AFB, conducts west coast space and missile launch operations, and manages the Western Range. The operation of Pillar Point AFS includes radar tracking, telemetry reception, command control, and communication services. Pillar Point AFS is subject to the plans and policies applicable to Vandenberg AFB. Pillar Point AFS is surrounded by cliffs, Princeton Marsh on the northeast, Pillar Point Harbor and Half Moon Bay on the east and south, respectively, and the Pacific Ocean on the west and the northwest. Beaches are located to the north and south of the station with rocky outcrops occurring offshore to the southwest. The James V. Fitzgerald Marine Reserve and the Monterey Bay National Marine Sanctuary are located along the west and north coast of the station, respectively. The topography of the Pillar Point area consists of a series of flat and rolling wave cut terraces bounded on the east by the Santa Cruz Mountains.

### **1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION**

#### **1.3.1 Purpose of the Proposed Action**

The Proposed Action is one of two actions being taken to comply with the California Ocean Plan. The Proposed Action would utilize LID techniques to enable greater on-site infiltration of storm water to improve storm water quality and restore natural water quality conditions. The goal of LID is to retain, infiltrate, filter, store, and evapotranspire a majority of storm water runoff on-site through cost-effective landscape features rather than route all storm water runoff through pipes to local waterways.

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UNITED STATES AIR FORCE  
VANDENBERG AIR FORCE BASE

LOCATION MAP



**TETRA TECH, INC.**

3201 Airpark Drive, Suite 108  
Santa Maria, CA 93455

TASK NO.	DATE	DRAWN BY	DWG NO.	FIGURE
99130	10/21/09	RANDALL	7696	1-1

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### 1.3.2 Need for the Proposed Action

The State Water Resources Control Board (SWRCB) notified Vandenberg AFB on 21 October 2004, alleging a violation of the California Ocean Plan (COP), arising from discharge of storm water into an Area of Special Biological Significance (ASBS) (the James V. Fitzgerald Marine Reserve located in San Mateo County) from Pillar Point AFS. The ASBS nearly borders Pillar Point AFS on all sides, except for Pillar Point Harbor which is not part of the ASBS. The SWRCB notification requested Vandenberg AFB to cease the discharge or file a request of exception to the COP prohibition. The 30th Space Wing's Environmental Quality Office (30 CES/CEANQ) submitted an application to the SWRCB for an exception to the COP prohibition, in order to comply with the SWRCB's timeline. The Air Force seeks to implement the Proposed Action to improve runoff water quality and make progress towards restoring natural water quality conditions in a manner consistent with federal and state goals and objectives.

Based upon a review of the site; estimated storm water flow volumes and rates; meetings with stakeholders (regulatory and non-regulatory), including the SWRCB and California Coastal Commission; and an evaluation of water quality treatment opportunities; multiple storm water discharge alternatives were assessed and evaluated. Retrofitting the site using LID techniques and continuing to discharge runoff to the ASBS via an existing concrete channel was selected as the most feasible alternative and most effective approach to addressing storm water discharge quality and quantity concerns. The Proposed Action would provide improved effluent quality, acceptable recurring costs, and minimal impacts on aesthetics, cultural resources, and receiving waters. Coupled with an exception to the COP prohibition, the Proposed Action would support compliance with the COP.

### 1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

The NEPA established a national policy to protect the environment and ensure that federal agencies consider the environmental effects of project actions in their decision-making. The CEQ is authorized to oversee and recommend national policies to improve the quality of the environment. The CEQ published regulations that describe how NEPA should be implemented. The CEQ regulations direct federal agencies to develop and implement procedures that address the NEPA process in order to avoid or minimize adverse effects on the environment. Title 32 CFR Part 989, *Environmental Impact Analysis Process*, addresses implementation of NEPA as part of the Air Force planning and decision-making process.

Air Force NEPA guidance provides for public participation in the NEPA process. Because the analysis conducted for the draft EA concluded that there would be no significant environmental effects from implementing the proposed project, Vandenberg AFB prepared a draft Finding of No Significant Impact (FONSI). The draft EA/FONSI for the Low Impact Development Retrofit of Pillar Point Air Force Station was available for public review for 30 days from 28 June 2010 to 29 July 2010. Minor clarifications were made to the draft EA in response to public comments. A response to public comments is also available at the following location:

Asset Management Flight, Natural Resources Management  
30 CES/CEAN  
1028 Iceland Avenue  
Vandenberg AFB, California 93437-6010  
ATTN: Environmental Coordinator

Based upon the information contained within this assessment, a Finding of No Significant Impact is made. The preparation of an Environmental Impact Statement is not required for this action.

**1.5 STRUCTURE OF THIS EA**

This EA analyzes and describes the potential environmental impacts that could result from the Proposed Action and Alternatives. As appropriate, the consequences of the actions on the affected environment are presented in terms of regional and site-specific descriptions.

Section 2.0 of this EA describes the Proposed Action, Alternative 1, and the No-Action Alternative. In addition to providing project information, this section describes the general parameters associated with the Proposed Action.

Section 3.0 provides regional and site-specific information related to air quality; cultural resources; environmental justice; geology and soils; hazardous materials and waste management; land use; natural resources; noise; police, fire, and emergency services; safety and occupational health; socioeconomic factors; solid waste; traffic and transportation; utilities; and water resources. The regional information included in this section provides the background for understanding the context of the site-specific information that could affect or be affected by the Proposed Action.

Section 4.0 addresses the potential effects of the Proposed Action on the resource areas analyzed. Possible impacts of project activities are analyzed, the significance of each impact is identified in each resource area, and best management practices (BMPs) that will be implemented, are so stated.

Sections 5.0 through 8.0 identify, respectively, references cited, persons and agencies contacted, preparers, and a list of acronyms used in this EA.

An air quality analysis (Tetra Tech 2010a), memorandum on slope stability (Earth Systems 2009), and a water quality modeling report (Tetra Tech 2010b) were also prepared for the proposed project, are incorporated herein by reference, and are on file at:

Environmental Flight  
30 CES/CEANOP  
1028 Iceland Avenue  
Vandenberg AFB, California 93437-6010  
ATTN: Environmental Coordinator

## 1.6 REGULATORY COORDINATION

The following regulatory coordination, approvals, and permits would be required for the Proposed Action:

- Obtain approval from the State Water Resources Control Board for the exception to the COP prohibition of discharges into an ASBS.
- Conduct informal consultation with the National Oceanic and Atmospheric Administration's Monterey Bay National Marine Sanctuary on the proposed project.
- Consult with the Amah Mutsun Tribal Band on a government-to-government basis regarding the proposed project.
- Coordinate with San Mateo County on the proposed haul routes during construction.

No adverse effects on the coastal zone are anticipated. The Air Force coordinated with the California Coastal Commission and requested concurrence with a Negative Determination, pursuant to the Coastal Zone Management Act. On 14 October 2011, the California Coastal Commission concurred with the Negative Determination.

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## **2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

### **2.1 DESCRIPTION OF THE PROPOSED ACTION**

The Proposed Action would utilize LID techniques enabling greater on-site infiltration of storm water, that has the added benefit of improved water quality. The goal of LID is to retain, infiltrate, filter, store, and evapotranspire a majority of storm water runoff on-site through cost-effective landscape features rather than route all storm water runoff through pipes to local waterways.

Storm water runoff at Pillar Point AFS either infiltrates into site soils, sheet flows over the cliff side into the ocean, or is channeled off-site through engineered drainages. The site layout of Pillar Point AFS is shown in Figure 2-1. Individual storm water drainage areas that flow off-site from the main base area (fenced area) are described below and shown in Figure 2-2.

- Drainage Area I includes the primary site drainage. Storm water runoff from this approximately 8.3 acres, with 65 percent impervious surface, collects in a concrete drainage channel adjacent to the circular facility perimeter road and is directed toward a flume near the guardhouse located at the base entrance. Runoff is discharged to the north through a culvert, conveyed through an engineered concrete drainage channel down the cliff face to the beach below, and subsequently into the ASBS. The discharge from this concrete drainage channel was identified by the SWRCB and serves as the basis for the designation by letter of COP non-conformance.
- Drainage Area II includes 10.78 acres of grassy slopes south of Area I and extends to the southernmost boundary of Pillar Point AFS. Storm water runoff that does not infiltrate collects in a depression and flows to the south over the cliff face toward Pillar Point Harbor.
- Drainage Area III drains a 0.98 acre area surrounding Building 17, where the majority of the surface is impervious. Runoff is directed toward the southwest corner of the Building 17 parking lot and discharges to an open area outside the Pillar Point AFS fenceline.
- Drainage Area IV is 2.22 acres and 100 percent vegetated portion of Pillar Point AFS, it does not contribute runoff to other Drainage Areas.
- Drainage Area V is approximately 10 acres and encompasses the area immediately northeast of Area I which includes both fenced and unfenced portions of Pillar Point AFS. Runoff from this area collects and drains into a small gunite drainage v-ditch channel approximately three feet wide, one foot deep, and 515 feet long. This gunite channel flows in a northeast direction toward Princeton Marsh and the West Shoreline Access Trail. This conveyance system eventually discharges to Pillar Point Harbor.

## ***2.0 Description of Proposed Action and Alternatives***

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NOTE: ALL AERIAL IMAGES OBTAINED FROM GOOGLE EARTH. IMAGES ARE VIEWED AS VISUAL AIDS ONLY AND DO NOT ACCURATELY REPRESENT ACTUAL SURFACE FEATURES.



ASBS

BORESIGHT FACILITY

WEST POINT AVE.

PILLAR POINT AIR FORCE STATION

UNITED STATES AIR FORCE  
PILLAR POINT  
AIR FORCE STATION  
SITE LAYOUT

**TETRA TECH, INC.**  
3201 Airpark Drive, Suite 108  
Santa Maria, CA 93455

TASK NO.	DATE	CREATED BY	SM ACAD FILE#	Figure
99130	3/27/2006	CRC	6625	2-1

## ***2.0 Description of Proposed Action and Alternatives***

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NOTE: ALL AERIAL IMAGES OBTAINED FROM GOOGLE EARTH. IMAGES ARE USED AS VISUAL AIDS ONLY AND DO NOT ACCURATELY REPRESENT ACTUAL SURFACE FEATURES.

**PACIFIC OCEAN**

EXISTING CONCRETE CHANNEL

EXISTING ASPHALT DRAINAGE CHANNEL

BASE ENTRANCE

**AREA V**

EXISTING GUNITE V-DITCH

**PILLAR POINT HARBOR**

EXISTING PERIMETER V-DITCH

**AREA I**

**AREA III**

**AREA II**

**AREA IV**

**PACIFIC OCEAN**

ASBS

**LEGEND:**

- DRAINAGE AREA BOUNDARY
- ★ EXISTING ASBS DISCHARGE
- EXISTING AF PROPERTY BOUNDARY
- EXISTING PERIMETER FENCING
- EXISTING STORM WATER DRAINAGE
- EXISTING STREET/PAVING
- EXISTING BUILDING



SCALE: 1" = 60m

UNITED STATES AIR FORCE  
PILLAR POINT

AIR FORCE STATION  
DRAINAGE AREAS



**TETRA TECH, INC.**

3201 Airpark Drive, Suite 108  
Santa Maria, CA 93455

TASK NO.	DATE	CREATED BY	PROJECT	Figure No.
T0130	6/7/06	CRC	PILLAR POINT	2-2

## ***2.0 Description of Proposed Action and Alternatives***

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The Proposed Action addresses the storm water runoff only from Drainage Area I, because this area encompasses all storm water runoff contributing to the existing storm water outfall discharging to the ASBS. The Proposed Action would promote local infiltration of runoff resulting in: (1) reduced runoff flow rates, (2) site hydrology that better mimics pre-development conditions, and (3) improved quality of storm water runoff.

The Proposed Action consists of (1) replacing a portion of an existing concrete v-ditch, located immediately to the south of the primary industrial facilities, with a series of vegetated bioretention cells and (2) installing two bioretention cells between Buildings 1 and 10 to promote infiltration of storm water runoff from adjacent impervious areas (Figure 2-3).

Storm water runoff from the northern half of impervious areas associated with Drainage Area I (Buildings 8, 13, 22 and surrounding paved area) would be collected in a new drop inlet before entering the northern loop road drainage ditch and re-routed via new underground piping across the entrance road to the proposed roadside bioretention cells. Runoff from impervious areas associated with the southwest corner of Drainage Area I would be routed to two proposed bioretention cells between Buildings 1 and 10 using existing aboveground drainage ditches. Overflow from these two bioretention cells would be routed to the roadside bioretention cells via existing aboveground drainage ditches. Storm water runoff from the vegetated hillside adjacent to the roadside bioretention cells would be intercepted by a drainage ditch constructed uphill of the roadside bioretention cells and conveyed to the existing storm water outfall.

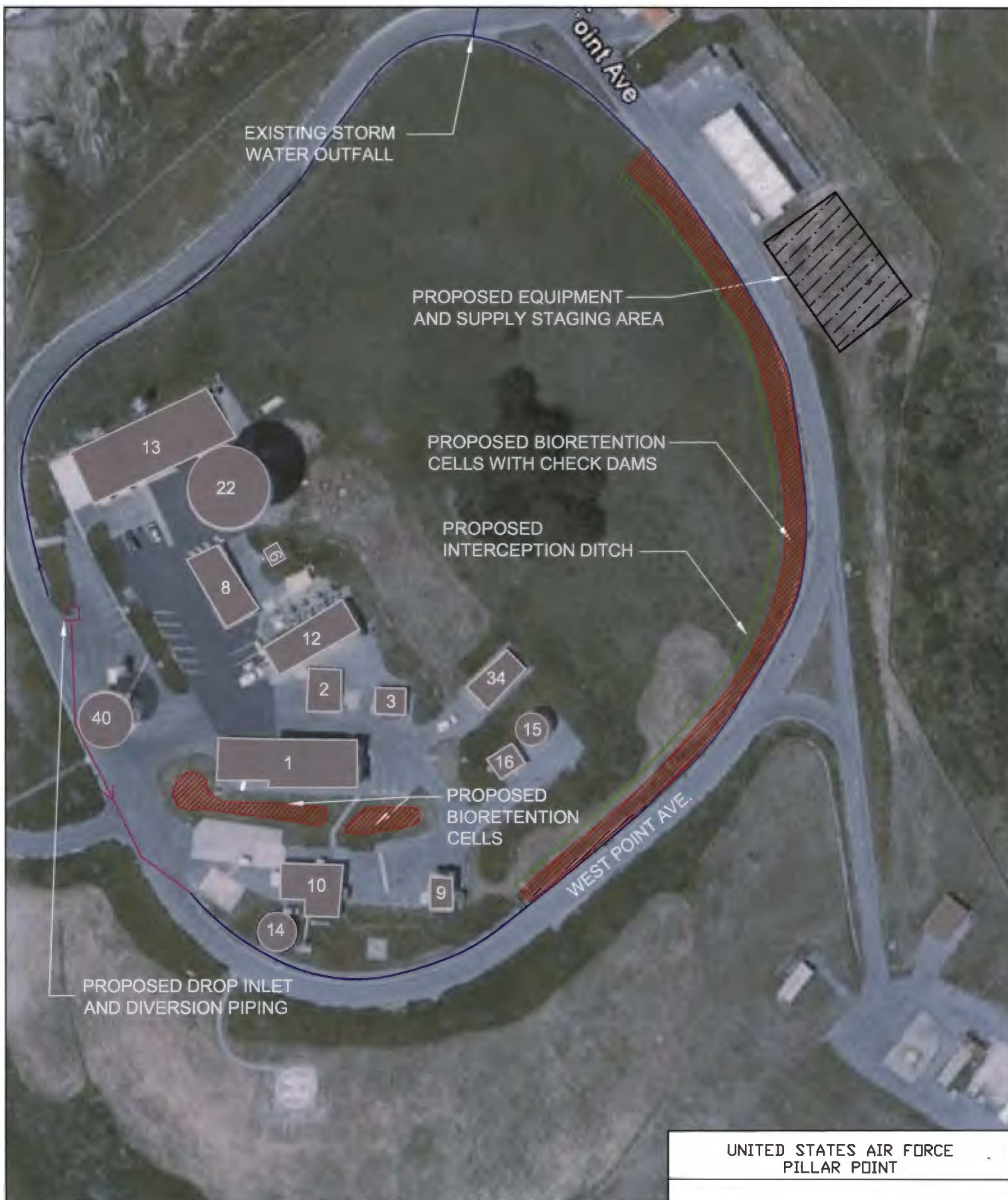
The roadside bioretention cells would retain storm water runoff until the maximum storage capacity is achieved at which point overflow from the bioretention cells would be conveyed to the existing storm water outfall. All bioretention cells (roadside and between Buildings 1 and 10) would be planted with native vegetation approved by Vandenberg AFB's Botanist. The roadside bioretention cells would contain a series of check dams. Additionally, the easternmost section of the roadside bioretention cells is sited within the limits of an ancient landslide, therefore an impermeable liner will be used within the boundaries of the ancient landslide as well as within 50 feet of the southern and northern limits of the slide (approximately 290 feet total). The surface area of all proposed bioretention cells would be approximately 11,500 square feet. During a storm event, the estimated maximum ponding time at the bioretention cells would be 1 hour.

Demolition of the existing concrete v-ditch would generate approximately 750 cubic yards (CY) of concrete and asphalt waste, which would be recycled offsite. Heavy equipment would be required to demolish the existing concrete v-ditch and to construct the proposed roadside bioretention cells. Construction of the drop inlet, underground drainage pipe, interception ditch, vegetated bioretention cells, and check dams would require approximately 2,500 CY of excavation. The majority of this soil volume would be exported off-site to an existing borrow area with a small amount used for backfill. Engineered fill in all bioretention cells would consist of 60 to 80 percent sandy soils, 10 to 20 percent silty soils, and 7 to 15 percent clayey soils to maximize storage capacity of the bioretention cells. In addition, approximately 750 CY of concrete or asphalt would be required during construction.

## ***2.0 Description of Proposed Action and Alternatives***

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#### LEGEND

- PROPOSED BMP LOCATION
- PROPOSED STAGING AREA
- PROPOSED INTERCEPTION DITCH
- PROPOSED DIVERSION PIPE
- EXISTING STORM WATER DRAINAGE CHANNEL
- 01 BUILDING



0 100 200

SCALE IN FEET

UNITED STATES AIR FORCE  
PILLAR POINT

PROPOSED ACTION



**TETRA TECH, INC.**

3201 AIRPARK DRIVE, SUITE 108  
SANTA MARIA, CA 93455

TC NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	FIGURE
	04/22/06				2-3

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Table 2-1 lists the construction equipment required for the project. The proposed staging area for construction equipment and supplies is shown in Figure 2-3.

**Table 2-1: Construction Equipment Required**

<b>Equipment Description</b>	<b>Estimated Hours Utilized</b>
Excavator Cat 220	256
Loader Cat 966 G	160
Skid Steer Cat 236	40
Water Truck	40
Compactor Cat 815F	20
Dump Truck (450 HP)	505

## **2.2 ALTERNATIVE 1**

Alternative 1 would be the same as the Proposed Action, but would divert the discharge to Pillar Point Harbor indirectly via Princeton Marsh. Under Alternative 1, the bioretention cells would be installed and runoff would be directed to an existing channel that parallels West Point Avenue (see Figure 2-1). At various points along this channel, runoff would be diverted under West Point Avenue through existing culverts to existing vegetated slopes and swales that are hydraulically connected to the Princeton Marsh. Portions of runoff not conveyed under West Point Avenue would continue flowing downhill in an easterly direction and into an existing downstream asphalt channel that terminates at Princeton Marsh (the easternmost discharge point) (Figure 2-1). The concrete and asphalt channel along West Point Avenue would be improved where necessary to meet capacity, as well as the culvert leading from West Point Avenue to the east end of Princeton Marsh (Figure 2-1). Ultimately, the flow would discharge to Pillar Point Harbor, but only indirectly through Princeton Marsh.

In Alternative 1, the corrugated metal pipe that currently conveys storm water to the ASBS, would be completely blocked, thus "ceasing" direct discharge to the ASBS.

## **2.3 NO-ACTION ALTERNATIVE**

The CEQ regulations require inclusion of a No-Action Alternative in an EA. The No-Action Alternative serves as a baseline against which the impacts of the Proposed Action and Alternatives can be evaluated.

Under the No-Action Alternative, no action would be taken to eliminate the discharge to the ASBS. All existing drainages and culverts would be cleaned to allow full capacity. The storm water discharge would be non-compliant with the RWQCB and could result in deleterious effects on marine life that occur offshore of the storm water outfall. Therefore, the No-Action Alternative would have greater impacts on water quality, natural resources, and land use than the Proposed Action or Alternative 1.

## **2.0 Description of Proposed Action and Alternatives**

### **2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION**

The following alternatives were considered but eliminated from consideration:

**Alternative 2:** On-site retention.

**Alternative 3:** Diversion/collection for injection at Boresight facility.

**Alternative 4:** Biofiltration (filter media) with 100 percent post-treatment discharge to vegetated swales, adjacent wetlands, or indirect discharge to harbor.

**Alternative 5:** Active treatment system (both chemical and physical processes) with 100% post-treatment discharge to vegetated swales, adjacent wetlands, or indirect discharge to harbor.

Alternative 2 (on-site retention) and Alternative 3 (diversion/collection for injection at the Boresight facility) are no longer being considered due to technical infeasibility and greater environmental impacts. The on-site retention was deemed infeasible due to the potential for soil destabilization and subsequent increased cliff erosion and seepage. Alternative 3 would require pumping water uphill; therefore, the level of effort and cost associated with long-term operations and maintenance would be greater than other alternatives which rely primarily on gravity flow diversion or retention. Diversion to the Boresight facility was eliminated primarily due to its location, level of effort required for operations and maintenance, and potential to impact cultural sites.

Alternatives 4 (Biofiltration) and 5 (Active Treatment System) are no longer being considered due to high capital costs with limited additional benefit relative to the Proposed Action and Alternative 1. Biofiltration would require using living material to capture and biologically degrade pollutants in storm water. This alternative was eliminated due to its high associated risk and potential to impact local natural resources (i.e., estimated removal of 5,000 CY of soil and slope destabilization). An active treatment system, although having less associated risk than biofiltration, was eliminated due to higher recurring costs resulting from required manpower to keep the system operative. Also, an active treatment system would have the potential to impact local natural resources (i.e., destabilize slopes).

### **2.5 BEST MANAGEMENT PRACTICES**

The following Best Management Practices (BMP) will be implemented during construction and operation of the project to minimize potential impacts on the environment:

**AIR-1.** The following measures will be implemented to control fugitive dust emissions:

- Water trucks or sprinkler systems will be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this will include wetting down areas in the late morning and after work is completed for the day. Watering frequency will be increased when wind speeds exceed 15 mph. Whenever possible, reclaimed water will be used. The use of excessive amounts of water will be avoided, which could cause runoff or erosion.
- The amount of disturbed area at any given time will be minimized.
- On-site vehicle speeds will be reduced to a maximum of 15 mph.

- Gravel pads will be installed at all access points to prevent tracking of mud onto public roads.
- If fill material is to be imported, exported, or stockpiled for more than 2 days, it will be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill to and from the site will be kept tarped from the point of origin.
- After clearing, grading, earth moving, or excavation is completed the disturbed area will be treated by watering, revegetating, or spreading soil binders until the area is re-planted.
- Vandenberg AFB shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off-site.

**AIR-2.** The following additional measures will be implemented to reduce NO<sub>x</sub> and PM<sub>2.5</sub> emissions from construction equipment:

- Whenever feasible, heavy-duty diesel-powered construction equipment manufactured after 1996 will be utilized.
- Construction equipment having the minimum practical engine size will be utilized.
- The number of pieces of construction equipment operating simultaneously will be minimized.
- Construction equipment will be maintained in accordance with manufacturer's specifications.
- Construction equipment equipped with two to four degree engine timing retard or pre-combustion chamber engines will be utilized.
- Catalytic converters on gasoline-powered equipment will be installed, if feasible.
- If available, diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters will be installed as certified and/or verified by U.S. Environmental Protection Agency (EPA) or California.
- Diesel-powered equipment will be replaced with electric equipment whenever feasible.
- Idling of heavy-duty diesel trucks during loading or unloading will be limited to 5 minutes; and auxiliary power units will be used whenever feasible.
- Worker trips will be utilized by requiring carpooling.

**CULT-1.** In the event that cultural resources are encountered during project-related ground disturbing activities, all excavation activities will be halted to avoid disturbance of the site or any nearby area reasonably suspected to include cultural resources. The 30 CES/CEANC would be contacted so that an archaeologist can assess the significance of the find.

## ***2.0 Description of Proposed Action and Alternatives***

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**GEO-1.** Prior to construction, a subsurface exploration will be performed including downhole logging of bucket auger borings to gather the following information:

- The depth of Terrace Deposits;
- The nature of the contact between the Terrace Deposits and the Purisima Formation;
- The orientations of bedding within the bedrock;
- The orientations and/or existence of tension cracks within the bedrock;
- The three-dimensional geometry of existing landslide masses near the bluff face; and
- The depths of influent penetration into the bedrock.

In addition, laboratory testing of samples collected from the borings will be performed to evaluate the shear strength parameters of the geologic units.

Should these additional analyses change the key assumptions of the slope stability analysis, particularly the bedding orientations or strength parameters, the slope stability analysis will be re-run to determine if impacts on geology and soils must be re-evaluated.

**HAZ-1.** Demolition waste will be inspected for surface coatings. If surface coatings are discovered, U.S. EPA's Toxicity Characteristic Leaching Procedure (TCLP) analysis will be performed to determine if the demolition debris containing lead-based paint or glaze is considered a hazardous waste (if total and soluble lead concentrations exceed 1,000 parts per million [ppm] or 5 ppm, respectively). If determined to be a hazardous waste, the demolition debris will be disposed of per applicable federal and California regulations.

**BIO-1.** Coastal terrace prairie habitat disturbed by the proposed project will be restored on a 1:1 basis onsite as directed by Vandenberg AFB's Botanist. A total of 0.43 acre of coastal terrace prairie habitat will be restored adjacent to the proposed bioretention cell adjacent to the Loop Road and an additional 0.18 acre of coastal terrace prairie habitat will be restored in the staging area for the proposed project, where coastal terrace prairie historically occurred but where non-native grassland currently exists.

The following maintenance and monitoring of the restored areas will be performed:

- a. Plantings in the coastal terrace prairie restoration areas will be monitored and maintained for three years following installation to ensure proper establishment. During this time, the Air Force will maintain a native plant coverage at a minimum of 70 percent; should this criteria not be met, the Air Force will install replacement plantings. Plants will be watered by hand every two to three days for the first two months following installation (unless these waterings can be supplemented by rainfall), and then on an as needed basis for the remaining three years to ensure proper establishment of the plants. Invasive plant species will be removed prior to installation of plantings and then annually during the following three years on an as needed basis in order to maintain invasive plant species cover at trace levels.

During the year of installation (year 0) and three years following installation (years 1, 2, and 3), the Air Force will perform three monitoring events per year during the spring. Field data collected during the monitoring events will include, but not be limited to:

- Number and condition of container plants;
- Evidence of reproduction (flowers, fruits etc);
- Percent cover of native species;
- Number and percent of invasive species;

- Information regarding the need to weed and water the site;
- Notes on precipitation and the water level within the bioretention cells; and
- Photographs from established photo points.

The Air Force will prepare annual monitoring reports to document the results of the monitoring efforts.

**BIO-2.** Before the commencement of construction, a pre-construction survey will be conducted in the construction areas in May for the following plant species on the California Native Plant Society List 1B:

- Pappose tarplant;
- San Francisco Bay spineflower;
- Fragrant fritillary;
- Point Reyes horkelia;
- Coast yellow leptosiphon;
- Choris' popcorn-flower; and
- San Francisco owl's clover.

If these plant species are found, a biological monitor will be present on-site during ground disturbing activities associated with construction to minimize impacts to these species. Voucher specimens will be collected for any of these plant species potentially directly impacted by construction activities and will be deposited at the nearest local herbarium.

**BIO-3.** For construction activities scheduled to occur during the bird nesting period from April 1 through August 30, a pre-construction survey for nesting birds will be conducted in areas of proposed ground disturbance two weeks prior to construction. If nesting birds are discovered in areas of proposed ground disturbance, Vandenberg Air Force Base will consult with the U.S. Fish and Wildlife Service to determine the measures needed to avoid impacts to birds protected under the Migratory Bird Treaty Act.

**WATER-1.** The following BMPs will be incorporated into an Erosion and Sediment Control Plan and implemented during construction to minimize erosion:

- a. Methods such as geotextile fabrics, erosion control blankets, drainage diversion structures, and/or siltation basins will be used to reduce erosion and siltation into storm drains during grading and construction activities.
- b. All entrances/exits to the construction site will be stabilized (e.g. using rumble plates, gravel beds or other best available technology) to reduce transport of sediment off-site. Any sediment or other materials tracked off-site will be removed within a reasonable time after they are tracked when feasible.
- c. Storm drain inlets will be protected from sediment-laden waters by the use of inlet protection devices such as gravel bag barriers, filter fabric fences, block and gravel filters, and excavated inlet sediment traps.
- d. Construction staging and storage areas will be shown on project plans.
- e. Erosion and sediment control measures will be in place throughout grading and development of the site until all disturbed areas are permanently stabilized.

## **2.0 Description of Proposed Action and Alternatives**

- f. Construction materials and waste such as mortar, concrete slurry, fuels, etc. will be stored, handled, and disposed of in a manner that minimizes the potential for storm water contamination. Bulk storage locations for construction materials and any measures proposed to contain the materials will be shown on project plans.
- g. A copy of the Erosion and Sediment Control Plan will be maintained on the project site during grading and construction activities.

**WATER-2.** All proposed and completed new storm water infrastructure will be inspected prior to the rainy season and maintained as detailed below:

- b. Plantings in the bioretention cells will be monitored and maintained for three years following installation to ensure proper establishment. During this time, the Air Force will maintain a native plant coverage at a minimum of 70 percent in the bioretention cells; should this criteria not be met, the Air Force will install replacement plantings. Plants will be watered by hand every two to three days for the first two months following installation (unless these waterings can be supplemented by rainfall), and then on an as needed basis for the remaining three years to ensure proper establishment of the plants.

During the year of installation (year 0) and three years following installation (years 1, 2, and 3), the Air Force will perform three monitoring events per year during the spring. Field data collected during the monitoring events will include, but not be limited to:

- Number and condition of container plants;
- Evidence of reproduction (flowers, fruits etc);
- Percent cover of native species;
- Number and percent of invasive species;
- Information regarding the need to weed and water the site;
- Notes on precipitation and the water level within the bioretention cells; and
- Photographs from established photo points.

The Air Force will prepare annual monitoring reports to document the results of the monitoring efforts.

- c. Invasive plant species will be removed from the bioretention cells on an annual basis as needed to maintain invasive plant species cover at trace levels (<1 percent cover) within the bioretention cells.
- d. Mulch will be replaced in the bioretention cells every two to five years to promote the uptake of heavy metals.
- e. The inlets, ponding and surface overflow areas, and underdrains of the bioretention cells, as well as the outfall at the ocean, will be inspected on an annual basis after the first storm of the season and then monthly during the rainy season to check for sediment accumulation and erosion. Any accumulated sediment or material that impedes flow into or out of the bioretention areas will be removed and properly disposed of. Signs of erosion will be addressed immediately by installation of erosion control BMPs and re-evaluation of the design of the LID system will be conducted to prevent any long-term erosion issues.

WATER-3. If the State Water Resources Control Board grants a General Exception to the California Ocean Plan prohibition of storm water discharges from Pillar Point AFS into an Area of Special Biological Significance, regular monitoring of the storm water discharges into the Area of Special Biological Significance will be conducted as required by the Special Protections monitoring requirements of the General Exception.

## ***2.0 Description of Proposed Action and Alternatives***

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### **3.0 AFFECTED ENVIRONMENT**

This chapter provides information on the current conditions at the Pillar Point AFS as it relates to each of the resource areas addressed in this EA.

#### **3.1 AIR QUALITY**

##### **3.1.1 Air Quality Setting**

###### **3.1.1.1 Regional Climate**

Pillar Point AFS is within the San Francisco Bay Area Air Basin (SFBAAB). Wet winters and dry summers characterize the region's climate. Rainfall totals can vary widely over a short distance, with windward coastal mountain areas receiving over 40 inches of rain, while leeward areas receive about 15 inches. During rainy periods, horizontal and vertical air movement ensures rapid pollutant dispersal. Rain also washes out air particulates and other pollutants.

Regional wind patterns vary from season to season. Wind tends to move from areas of high pressure to areas of low pressure. In warmer months, air currents move onshore from the Pacific Ocean to inland areas. While Pacific Ocean air is generally free of harmful air pollutants, it receives emissions from numerous sources (anthropogenic and biogenic), and will then carry these pollutants to distant areas. Mountains and valleys often affect onshore winds. This means that a wind pattern that started as a northwesterly will often change direction 90 degrees or more when it encounters topographic features. Normally, air temperatures decrease with increasing elevations. Sometimes this normal pattern is inverted, with warmer air aloft, and cool air trapped near the earth's surface. This phenomenon occurs during all seasons. In summer, especially when wind speeds are very low, a strong inversion will trap air emissions and high levels of ozone smog can occur. In winter, a strong inversion can trap emissions of particulate and carbon monoxide near the surface, resulting in unhealthy air quality.

The climatological pollution potential of an area is largely dependent on winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and low inversions produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 miles per hour (mph), smog potential is greatly reduced. High particulate matter levels can occur in areas of intense motor vehicle use, such as freeways, ports, etc., and in most valley areas where residential wood smoke and other pollutants are trapped by inversions and stagnant air.

###### **3.1.1.2 Local Climate**

Pillar Point AFS is within the climatological subregion known as the Peninsula. The Peninsula region extends from northwest of San Jose to the Golden Gate in San Francisco. The Santa Cruz Mountains bisect the peninsula, with elevations exceeding 2,000 feet at the southern end and decreasing in the north to 500 feet in South San Francisco. Coastal towns experience a high incidence of cool, foggy weather in the summer. Cities in the southeastern peninsula experience warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west. San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet, marine air is able to flow easily across most of the city, making its climate cool and windy.

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. For example, in coastal areas and San Francisco, the mean maximum summer temperatures are in the mid-60's, while in Redwood City, the mean maximum

### 3.0 Affected Environment

summer temperatures are in the low-80's. Mean minimum temperatures during the winter months are in the high-30's to low-40's on the eastern side of the Peninsula and in the low 40's on the coast.

Two important gaps in the Santa Cruz Mountains occur on the peninsula. The larger of the two is the San Bruno Gap, extending from Fort Funston on the ocean to the San Francisco Airport. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are under 200 feet, marine air easily penetrates into the bay. The other gap is the Crystal Springs Gap, between Half Moon Bay and San Carlos. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen from San Mateo to Redwood City. Annual average wind speeds range from 5 to 10 mph throughout the peninsula, with higher wind speeds usually found along the coast. However, winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno Gap and the Crystal Springs Gap. The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. For example, Fort Funston in western San Francisco shows a southwest wind pattern while Pillar Point in San Mateo County shows a northwest wind pattern. On the east side of the mountains winds are generally from the west, although wind patterns in this area are often influenced greatly by local topographic features.

Air pollution potential is highest along the southeastern portion of the peninsula. This is the area most protected from the high winds and fog of the marine layer. Pollutant transport from upwind sites is common. In the southeastern portion of the peninsula, air pollutant emissions are relatively high due to motor vehicle traffic as well as stationary sources. At the northern end of the peninsula in San Francisco, pollutant emissions are high, especially from motor vehicle congestion. Localized pollutants, such as carbon monoxide, can build up in "urban canyons". However, winds are generally fast enough to carry the pollutants away before they can accumulate.

Climate data from Half Moon Bay is presented in Table 3-1.

**Table 3-1**  
**Climate Data, Half Moon Bay**

Month	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Total Precipitation (inches)
January	58.2	42.8	5.29
February	59.2	43.6	4.50
March	59.8	43.9	3.82
April	60.6	44.6	1.89
May	61.7	47.5	0.74
June	63.3	49.8	0.27
July	64.2	51.9	0.11
August	65.1	52.7	0.18
September	66.9	51.3	0.35
October	65.8	48.3	1.57
November	62.7	45.6	3.05
December	58.9	43.4	4.56
Annual	62.2	47.1	26.34

**Note:** Period of Record: 7/1/1939 to 12/31/2008

**Source:** Western Region Climate Center (<http://www.wrcc.dri.edu>.)

### 3.1.2 Regulatory Setting

Regulation of air pollution is achieved through both national and State ambient air quality standards and emissions limits for individual sources of air pollutants. The 1970 federal Clean Air Act established national ambient air quality standards for six criteria pollutants—ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead—to protect public health and welfare. These pollutants, which are pervasive in the environment and which have clear impacts on health, are called “criteria air pollutants” because the federal government has established criteria and standards for each of them. California had already established its own air quality standards when the federal standards were established. Because of the unique meteorological conditions and associated air quality problems in California, the State standards are generally more stringent than the federal standards that are currently in effect, as shown in Table 3-2.

Amendments to the federal Clean Air Act require the U.S. Environmental Protection Agency (U.S. EPA) to classify air basins or portions thereof, as either in “attainment” or “nonattainment” for each criteria pollutant, based on whether or not the national standards have been achieved. The California Clean Air Act (CCAA) passed by the State Legislature in 1988 also requires areas to be designated as “attainment” or “nonattainment” based on whether or not State standards have been achieved. Areas in California thus have two sets of attainment/nonattainment designations: one for the federal standards and one for State standards. Current attainment status is listed in Table 3-3, and described in more detail in the next section on Bay Area Plans, Policies, and Attainment. Under the federal Clean Air Act, jurisdictions with nonattainment areas are required to prepare air quality plans (State Implementation Plans or SIPs) that include strategies for achieving attainment. Similarly, the CCAA requires nonattainment jurisdictions to prepare air quality plans showing strategies for achieving attainment with respect to State standards.

### 3.1.3 Attainment Designations

The Bay Area is currently designated “nonattainment” for State and national ozone and particulate matter less than 2.5 micrometers ( $PM_{2.5}$ ) standards, as well as for the State particulate matter less than 10 micrometers ( $PM_{10}$ ) standard (Bay Area Air Quality Management District [BAAQMD] 2010). Urbanized areas within the Bay Area are also designated as a “maintenance” area for the national carbon monoxide standard. The “maintenance” designation denotes that the area that is now designated as “attainment” had once been designated as “nonattainment.” The Bay Area is in “attainment” or is “unclassified” for all other ambient air quality standards. In June 2005, the U.S. EPA revoked the national one hour ozone standard. Effective May 27, 2008, the national eight hour ozone standard was lowered from 0.08 parts per million (ppm) to 0.075 ppm. The U.S. EPA is required to issue final designations based upon the new 0.075 ppm standard by July 2011 (BAAQMD 2010). In 2006, the U.S. EPA revised the 24 hour  $PM_{2.5}$  standard from 65 grams per cubic meter ( $g/m^3$ ) to 35  $g/m^3$ . The designation of the Bay Area as nonattainment for the 24 hour national standard  $PM_{2.5}$  became effective on December 14, 2009. In April 2005, the State adopted the eight hour ozone standard of 0.07 ppm.

**Table 3-2**  
**Ambient Air Quality Standards**

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards <sup>1</sup>		Federal Standards <sup>2</sup>		
		Concentration <sup>3</sup>	Method <sup>4</sup>	Primary <sup>3,5</sup>	Secondary <sup>3,6</sup>	Method <sup>7</sup>
Ozone (O <sub>3</sub> )	1 Hour	0.09 ppm (180 µg/m <sup>3</sup> )	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m <sup>3</sup> )		0.075 ppm (147 µg/m <sup>3</sup> )		
Respirable Particulate Matter (PM <sub>10</sub> )	24 Hour	50 µg/m <sup>3</sup>	Gravimetric or Beta Attenuation	150 µg/m <sup>3</sup>	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m <sup>3</sup>		—		
Fine Particulate Matter (PM <sub>2.5</sub> )	24 Hour	No Separate State Standard		35 µg/m <sup>3</sup>	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m <sup>3</sup>	Gravimetric or Beta Attenuation	15.0 µg/m <sup>3</sup>		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m <sup>3</sup> )	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m <sup>3</sup> )	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m <sup>3</sup> )		35 ppm (40 mg/m <sup>3</sup> )		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m <sup>3</sup> )		—	—	—
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Arithmetic Mean	0.030 ppm (57 µg/m <sup>3</sup> )	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m <sup>3</sup> )	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m <sup>3</sup> )		0.100 ppm (see footnote 8)	None	
Sulfur Dioxide (SO <sub>2</sub> )	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m <sup>3</sup> )	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m <sup>3</sup> )		0.14 ppm (365 µg/m <sup>3</sup> )	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m <sup>3</sup> )	—
	1 Hour	0.25 ppm (655 µg/m <sup>3</sup> )		—	—	
Lead <sup>9</sup>	30 Day Average	1.5 µg/m <sup>3</sup>	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m <sup>3</sup>	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average <sup>10</sup>	—		0.15 µg/m <sup>3</sup>		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		Federal Standards		
Sulfates	24 Hour	25 µg/m <sup>3</sup>	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m <sup>3</sup> )	Ultraviolet Fluorescence			
Vinyl Chloride <sup>9</sup>	24 Hour	0.01 ppm (26 µg/m <sup>3</sup> )	Gas Chromatography			
See footnotes on next page ...						

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990

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**Table 3-2 (continued)**  
**Ambient Air Quality Standards**

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM<sub>10</sub>, PM<sub>2.5</sub>, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM<sub>10</sub>, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m<sup>3</sup> is equal to or less than one. For PM<sub>2.5</sub>, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.
8. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).
9. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
10. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

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#### 3.1.4 Attainment Plans and Policies

As noted above, the federal Clean Air Act and the CCAA require plans (SIPs) to be developed for nonattainment areas (with the exception of areas designated as nonattainment for the State  $PM_{10}$  and  $PM_{2.5}$  standards). The plan developed for the region is:

- Bay Area 2001 Ozone Attainment Plan (BAAQMD 2001), developed to meet federal ozone air quality planning requirements.

The BAAQMD also prepared the Bay Area 2005 Ozone Strategy in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the State one-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

As discussed earlier, areas designated as nonattainment for the federal air quality standards are required to adopt and implement plans that include actions and compliance strategies to achieve compliance. The Bay Area 2001 Ozone Attainment Plan, the most recent federal ozone plan, includes five new Transportation Control Measures (TCMs), in addition to a set of 28 TCMs intended to reduce emissions from on road vehicles that are included as commitments in prior air quality plans. Of the 28 federal TCMs, 12 date from the 1992 Bay Area Air Quality Plan and 16 contingency TCMs were added by court order in 1991 pursuant to litigation over the 1982 Plan. The 16 contingency TCMs were adopted to make up the shortfall in emission reductions from TCMs 1 through 12, as calculated in 1987. Also, the 2001 Plan identifies several measures for further study. In June 2005, the federal one hour ozone standard was revoked; however the emission reduction measures contained in this plan are still being carried out by the BAAQMD (BAAQMD 2001).

#### 3.1.5 Existing Air Quality

The BAAQMD maintains a network of air quality monitoring stations across the county. Table 3-3 summarizes the last three years of air quality data for the closest station to Pillar Point AFS.

**Table 3-3  
Air Quality Data**

<b>Pollutant/Standard</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<u>Ozone (1-hour)<sup>1</sup></u>			
Maximum Concentration (ppm)	0.085	0.077	0.082
Days > CAAQS (0.09 ppm)	0	0	0
Days > NAAQS (revoked)	0	0	0
<u>Ozone (8-hour)<sup>1</sup></u>			
Maximum Concentration (ppm)	0.063	0.069	0.069
Days > CAAQS (0.07 ppm)	0	0	0
Days > NAAQS (0.075 ppm)	0	0	0

**Table 3-3 (Cont.)  
Air Quality Data**

<b>Pollutant/Standard</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<u>PM<sub>10</sub> (24-hour)<sup>1</sup></u>			
Maximum State Concentration (µg/m <sup>3</sup> )	69.9	55.8	41.0
Maximum National Concentration (µg/m <sup>3</sup> )	66.2	52.2	38.2
Days > CAAQS (50 µg/m <sup>3</sup> )	10.2	6	*
Days > NAAQS (150 µg/m <sup>3</sup> )	0	0	*
<u>PM<sub>2.5</sub> (24-hour)<sup>1</sup></u>			
Maximum Concentration (µg/m <sup>3</sup> )	75.3	45.4	27.9
Days > NAAQS (35 µg/m <sup>3</sup> )	2.6	2.9	0
<u>CO (8-hour)<sup>2</sup></u>			
Maximum Concentration (ppm)	2.94	2.71	2.48
Days > CAAQS (9.0 ppm)	0	0	0
Days > NAAQS (9.0 ppm)	0	0	0
<u>NO<sub>2</sub> (1-hour)<sup>2</sup></u>			
Maximum Concentration (ppm)	0.107	0.069	0.080
Days > CAAQS (0.25 ppm)	0	0	0
<u>SO<sub>2</sub> (24-hour)<sup>3</sup></u>			
Maximum Concentration (ppm)	0.007	0.006	0.004
Days > CAAQS (0.04 ppm)	0	0	0
Days > NAAQS (0.14 ppm)	0	0	0

Source: <http://www.arb.ca.gov/adam/welcome.html> (CARB 2009)

<sup>1</sup> Data from Redwood City Station

<sup>2</sup> Data from Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages - San Francisco Bay Area Air Basin

<sup>3</sup> Data from Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages - San Francisco Arkansas Street

**Definitions:**

CAAQS—California Air Quality Standards

NAAQS—National Ambient Air Quality Standards

PM<sub>10</sub>—particulate matter less than 10 micrometers

PM<sub>2.5</sub>—particulate matter less than 2.5 micrometers

CO—carbon monoxide

NO<sub>2</sub>—nitrogen dioxide

SO<sub>2</sub>—sulphur dioxide

ppm—parts per million

µg/m<sup>3</sup>—micrograms per cubic meter

µg/m—micrograms per meter

\* — Not applicable

## 3.2 CULTURAL RESOURCES

### 3.2.1 Cultural Setting

#### 3.2.1.1 Prehistoric, Ethnohistoric, and Modern Native American Groups

At the time of European contact (c. 1770 A.D.), the area now called Half Moon Bay was inhabited by the Costanoans (from the Spanish “Los Costanos,” the coast people) (Science Applications International Corporation [SAIC] 1994a). Costanoan is a language family consisting of eight languages, one of which is Ramaytush. In 1978, Ramaytush was spoken by approximately 1,400 people in San Mateo and San Francisco counties, including the native peoples of the Half Moon Bay area (SAIC 1994a).

Costanoan populations experienced dramatic decline after contact was established with emerging Spanish and Anglo-American cultures. The Costanoan population in A.D. 1170 has been estimated at 7,000 to

### **3.0 Affected Environment**

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10,200 (SAIC 1994a). The basic unit of the Costanoan political organization was the triblet, consisting of one or more socially linked villages and smaller settlements with a recognized territory. Subsistence activities emphasized gathering berries, greens, bulbs (especially soap root); harvesting seeds and nuts; hunting deer, elk, pronghorn, and smaller animals; collecting shellfish; and taking varied fishes in streams, bays, lagoons, and open coastal waters (SAIC 1994a). The most common type of dwelling was a domed structure thatched with tule, grass, wild alfalfa, ferns, or carrizo. Conical houses of split redwood or redwood bark were also constructed among the Ramaytush. These structures were normally arranged around a central cleared area that was located near a convenient source of water. Shells were used for adornment and also as a medium of exchange with neighboring Plains Miwok, Sierra Miwok, and Yokuts.

The Costanoan people, like many other coastal groups, were greatly affected by the European presence. The missionization process had a dramatic impact on the native populations and their lifeways. The Spanish Mission system led to a 95 percent reduction in the population between 1770 and 1790 (SAIC 1994a). In 1971, descendants of the Costanoans united in a corporate entity, the Ohlone Indian Tribe, and received title to the Ohlone Indian Cemetery where their ancestors who died at the Mission San Jose are buried. In 1978, the estimated number of persons of Costanoan decent in the San Francisco Bay area was over 200 (SAIC 1994a).

#### **3.2.1.2 Historic Setting**

##### **Historic Period**

Spanish knowledge of the region came in A.D. 1585 when the navigator Francisco Gali sailed past Half Moon Bay (SAIC 1994a). The first Spanish exploration of the Pillar Point area occurred in 1769, when Gaspar de Portola visited the Costanoan settlement of Shalaihme at Purissima Creek just south of Half Moon Bay. The first Spaniards settling in the area were missionaries associated with Mission Dolores, which was established in San Francisco in 1782. This mission, with its outpost at Pacifica, was the center of Spanish influence in the region and affected native patterns of settlement, culture, trade, industry, and agriculture. Following the Mexican Revolution in 1821, California became part of the Republic of Mexico. Legal secularization later resulted in confiscation of mission lands, which were then granted or sold for farming and ranching. The area that is now Pillar Point was part of the 7,766-acre northern section of rancho Corral de Tierra, granted by Mexico to Francisco Guerrero Polamares. When California became a state in 1850, settlers moved into the area. Most of these settlers continued to use the land for farming and grazing. Pillar Point was also a center for the whaling industry under the Portuguese in the 1870s (SAIC 1994a). The area remained in farming and grazing use until the World War II Era.

##### **World War II Era**

In 1940, the U.S. Army purchased 12.68 acres of the northern section of Corral de Tierra ranch land from Josephine C. Valencia and established an artillery observation post on the bluff. There was real concern that the Japanese would attack San Francisco, a fear that became stronger after the bombing of Pearl Harbor in 1941. Building #6 at the Pillar Point AFS, a reinforced concrete bunker with a metal roof, was one of the 81 "base ends," or fire control stations installed along the coast from Point Reyes to Pillar Point. They were used as reference points to measure the distance and coordinates of an enemy ship. These stations were manned by observers to watch for the appearance of Japanese ships.

There were four other structures on Pillar Point AFS as well as Building #6 dating from World War II: a wood underground bunker cut into the side of the hill adjacent to the concrete bunker #6 and facing east (burned in the early 1970s); a concrete bunker at the edge of the cliff (bulldozed); two concrete piers on

the hill above #6 (still existing); and a small concrete bunker cut into the hill (still existing) and facing inland (north) (SAIC 1994a). After World War II, the Pillar Point observation post was deactivated. In 1959, it was transferred from the U.S. Army to the U.S. Navy.

### **Cold War Era**

The Cold War – and the various military strategies that it engendered – arose out of the development of the atomic bomb and nuclear power in the early 1940s by the U.S. This trend toward military rather than peacetime uses of nuclear energy came about in part because of the change in the political climate from 1945 to 1950, at which time the stance of the U.S. toward the Soviet Union, its World War II ally, hardened into enmity, which translated in to what became known as the Cold War (SAIC 1994a). Through a series of events in the Soviet Union in 1948-49, such as the detonation of the Soviet Union's first atomic bomb, its blockade of Berlin, and its growing influence in neighboring China, the U.S. came to believe that the Soviets were planning both to claim the world for Communism and to eradicate the U.S. through a surprise nuclear attack.

As a response to the threat of a Soviet military buildup and a surprise attack, the U.S. Air Force, which became a separate service from the Army after World War II, saw as its post-war mission the development of “long-range offensive operations,” which included the use of ballistic missiles. In particular, the Strategic Air Command, a branch of the Air Force created in 1946, was placed in charge of the operation of ballistic missiles and developed the policy of maintaining a certain percentage of its missiles on ground alert 24 hours a day (SAIC 1994a). Although long-range missiles development began right after World War II, it did not become established until 1953, when intelligence data indicated that the Soviet Union had achieved superiority in their development of ballistic missiles. Consequently, the program to develop missiles, particularly the Atlas intercontinental ballistic missile (ICBM), took priority, hastened by the launching of Sputnik by the Soviet Union in 1957. Patrick AFB (Cape Canaveral) was developed as a launch site for missiles during their research and development phase.

In 1956, Vandenberg AFB, then called Camp Cooke, was chosen as the Air Force's West Coast Missile Center, designed to test-launch ICBMs once they had become operational. Additionally, Cooke AFB, as it was renamed, was to train “Missileers” in launching procedures. This site was chosen for a missile center because of its size, remoteness, existing buildings, and most importantly, because it was the only site in the continental U.S. that could launch missiles into polar orbit without traveling over land. Missile launch and control facilities were built, and the first missile, the Thor, was launched in 1958.

That same year, the Navy received 20,000 acres of former Camp Cooke land south of the Air Force operations, on which to build the Naval Missile Facility at Point Arguello under the jurisdiction of the Naval Air Missile Test Center at Point Mugu (SAIC 1994a). The Pacific Missile Range (now the Western Range), an area of ocean extending from Vandenberg AFB into the Indian Ocean, was established for tracking and monitoring missile launches. The U.S. Air Force assumed control of the Naval Test Facility and Pacific Missile Range in 1964, renaming the area South Vandenberg AFB. A network of radar, telemetry, and optics systems were installed uprange at Vandenberg AFB, Pillar Point AFS, Anderson Peak, Santa Ynez Peak, and midrange in the Hawaiian Islands to support missile operations conducted on the Western Range.

#### **3.2.2 Regulatory Setting**

The following federal regulations, policies, and laws protect archaeological and other historic resources on federal land:

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- Antiquities Act of 1906 (16 U.S.C. 431-433);
- Historic Sites Act of 1935 (16 U.S.C 461-467);
- Sections 106 and 110 of the National Historic Preservation Act (NHPA) (Public Law [PL] 89-665 and 16 U.S.C 470-470W, 36 CFR 800);
- Archaeological and Historic Preservation Act of 1974 (16 U.S.C 469);
- Archaeological Resources Protection Act (as amended, PL 96-95 and 16 U.S.C 470aa-470mm);
- Native American Graves Protection and Repatriation Act (PL 101-601 and 25 U.S.C 3001-3013);
- American Indian Religious Freedom Act (as amended, PL 95-341 and 42 U.S.C 1996-1996a);
- Executive Order (EO) 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971);
- EO 13007, *Indian Sacred Sites* (May 24, 1996);
- EO 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000);
- *Memorandum for Heads of Executive Departments and Agencies re: Government-to-Government Relations with Native American Tribal Governments* (April 29, 1994); and
- DoD's *Annotated Policy on American Indians and Alaska Natives* (October 27, 1999).

Vandenberg AFB's Integrated Cultural Resources Management Plan provides additional direction and policy specific to properties owned and operated by Vandenberg AFB.

Under Section 106 of the NHPA, Vandenberg AFB must consult with the State Historic Preservation Officer (SHPO) for projects that have the potential to affect a significant historic resource (i.e., historic archaeological resource or historic architectural resources) or historic district. Section 106 of the NHPA also requires that representatives of ethnic groups potentially affected by a project be contacted to solicit their concerns and viewpoints about potential impacts to resources significant to them.

#### 3.2.3 Cultural Resource Studies

An archaeological site record and literature search was completed for Pillar Point AFS at the Northwest Information Center at Sonoma State University by Applied EarthWorks in 2005 (SAIC 1994a). Previous archaeological studies and archaeological resources within 0.25 mile of the Pillar Point AFS were also identified during the record search.

The entire Pillar Point AFS was surveyed for archaeological resources by Alex N. Kirkish, Vandenberg AFB Staff Archaeologist, in 1993 (U.S. Air Force 1993). Kirkish recorded several sites at Pillar Point AFS, however, none are within the Proposed Action site, including the area of ground disturbance as well as the proposed staging and storage area and access route. One of these sites is directly located within the Alternative 1 site and another is in close proximity to the site as well as described in more detail below. No new surveys were conducted for the proposed project.

All sites recorded within the Pillar Point AFS by Kirkish were later evaluated for National Register for Historic Places (NRHP) eligibility by Applied Earthworks in a draft report (Applied Earthworks 2005). Additionally, all buildings on the Pillar Point AFS have been surveyed for NRHP eligibility by SAIC and documented in a draft report (SAIC 1994a). More details are provided for each site below.

### 3.2.4 Identified Cultural Resources

#### 3.2.4.1 Archaeological Resources

Three archaeological sites were identified by Kirkish (U.S. Air Force 1993): CA-SMA-109; CA-SMA-151; and CA-SMA-347. Site CA-SMA-151 is directly within the Alternative 1 site and site CA-SMA-347 is located immediately adjacent to the Alternative 1 site.

Site CA-SMA-151 is a large prehistoric shell midden, believed by Kirkish to be a probable village site associated with a series of other archaeological sites (U.S. Air Force 1993). It was listed on the NRHP in 1978 and is therefore considered a significant historic property. Testing of the site has only occurred within the roadway, so site boundaries outside of the roadway are ill-defined and based only on early recordings and surface materials in a densely vegetated area. Applied EarthWorks' testing found that an unknown amount of midden has been graded away and redeposited in one area of the site (Applied EarthWorks 2005). However, this did not appear to have affected the lower levels of the deposit where significant, intact archaeological materials remain. Artifacts suggest that the site represents a regional variant of the Berkeley Pattern known as the Monterey Aspect. The presence of the Berkeley Pattern in this area is thought to be indicative of the eastern expansion of the Miwok and Costanoan groups. The site has been dated to the Upper Archaic and Upper Emergent periods (500 BC – AD 1690) based on temporally sensitive artifacts and radiocarbon dates.

Site CA-SMA-347 (given a preliminary number of PP-2) is described by Kirkish as a sparse shell and lithic scatter. The site was recommended as NRHP-ineligible by Applied EarthWorks (2005). Applied EarthWorks interpreted the site as a location of tool manufacturing, resharpening, or maintenance. No chronological indicators were recovered from the site and as such, the age of the site is unknown. A portion of the site has been eroded away along the cliff face.

#### 3.2.4.2 Historic Architectural Resources

Three Pillar Point AFS buildings were determined to be NRHP-eligible as part of a Cold War historic district, and the Western Range Landbased Instrumentation Support Systems Historic District (WRLISSHD) (SAIC 1994a). These facilities include Building Nos. 18, 22, and 40. All other buildings and structures at Pillar Point AFS have been evaluated and determined to be non-contributing elements to the WRLISSHD. The WRLISSHD includes historic Air Force Western Range land-based instrumentation support facilities at Vandenberg AFB and remote (or "satellite") installations that supported operational Cold War space program and ballistic missile missions of exceptional importance during their critical design, development, and testing phases. The historic district is managed by Vandenberg AFB through a 2002 Programmatic Agreement with the SHPO, the *Programmatic Agreement Between Vandenberg Air Force Base, California and the California State Historic Preservation Officer Regarding the Management of Exceptionally Important Cold War Historic Properties Under the Jurisdiction of Vandenberg Air Force Base, California*.

Building Nos. 18 and 22 are not located near the Proposed Action site or the Alternative 1 site, however, installation of new diversion piping would occur immediately adjacent to Building No. 40 under the Proposed Action (see Figure 2-3).

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#### **3.2.5 Native American Consultation**

Vandenberg AFB staff contacted the Amah Mutsun Tribal Band during the week of December 3, 2007 to consult with them on a government-to-government basis regarding the proposed project. Vandenberg AFB received a letter from the Tribal Chair on 14 February 2008 stating the Tribe prefers an alternative that avoids impacts to archaeological sites.

#### **3.3 ENVIRONMENTAL JUSTICE**

Environmental justice is defined by the U.S. EPA as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations. The Air Force regulations for implementing the Environmental Impact Analysis Process contained in Title 32 CFR § 989.33, require that a project proponent comply with EO 12898 to ensure that these types of impacts are considered in EAs and other environmental documents.

The U.S. Census Bureau reports numbers of minority residents. Minority populations included in the census are identified as Black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Hispanic, or Other. According to the U.S. Census Bureau, San Mateo County had an estimated population of 712,690 persons in 2008. Of this total, 231,624 persons, or 32.5 percent, were minority (U.S. Census Bureau 2009). In addition, 6 percent of the population of San Mateo County is living below the poverty level (U.S. Census Bureau 2009).

#### **3.4 GEOLOGY AND SOILS**

##### **3.4.1 Regional Geologic Setting**

Pillar Point AFS is located within the Coast Ranges geomorphic province of California. The Coast Ranges extend from the Transverse Ranges geomorphic province, located approximately 300 miles to the south, to the Klamath Mountains, located about 250 miles north of the project site (Fugro 1999). The Coast Ranges province is bordered by the Pacific Ocean to the west and the Great Valley province to the east. The Coast Ranges generally consist of northwest-trending mountain ranges and are characterized by north-northwest trending faults and folds (Fugro 1999). The coastal region comprises a series of flat and rolling wave-cut terraces extending east toward the foothills of the Santa Cruz Mountains.

The project area is part of the Jurassic/Cretaceous Salinian Block, which is characterized by crystalline basement rocks (Fugro 1999). The San Andreas fault, located approximately 7 miles east of the project area, delineates the eastern boundary of the Salinian Block and is also considered the tectonic demarcation between the Pacific and North American tectonic plates. The Salinian Block is believed to be a fragment of the North American tectonic plate that has been translated northward, possibly tens to hundreds of miles (Fugro 1999).

##### **3.4.2 Site Setting**

Pillar Point AFS is on an isolated peninsula connected to the mainland by an isthmus of land located northeast of Pillar Point AFS. Vertical 80- to 140-foot high sea cliffs surround the point. The top of the

peninsula has relatively rounded and smooth topography ranging in elevation from about 80 to 181 feet above mean sea level. Slopes on Pillar Point AFS range from vertical at the seacliff to 2 to 17 degrees on natural slopes on the bluff top (Fugro 1999).

#### **3.4.2.1 Bedrock and Soils**

The gently sloping areas are underlain by Terrace Deposits (Qt) over Purisima Formation (Tp) bedrock (Earth Systems 2009) (Figure 3-1). Localized outcrops of the Purisima Formation shale and conglomerate are exposed at Pillar Point AFS. The Purisima Formation is an early to middle Pliocene-epoch marine conglomerate, with fine-grained sandstone, mudstone, and shale, which are exposed along the steep seacliffs. At Pillar Point AFS, the Purisima Formation is predominantly composed of moderately to highly weathered mudstone and sandstone.

The U.S. Department of Agriculture's (USDA) Soil Conservation Service classifies the soil type at Pillar Point AFS as Tierra soils. These soils are identified by the USDA soil classification system as clay loam to sandy loam and are described as highly erosive.

Artificial fill materials also occur at Pillar Point AFS, with an estimated thickness of 0 to 5 feet (Fugro 1999). The artificial fill materials' composition and characteristics are unknown, however, the material is likely composed of derivatives of Terrace Deposits and Purisima Formation materials with minor amounts of fill material, such as aggregate base.

#### **3.4.2.2 Seismicity and Seismic Related Hazards**

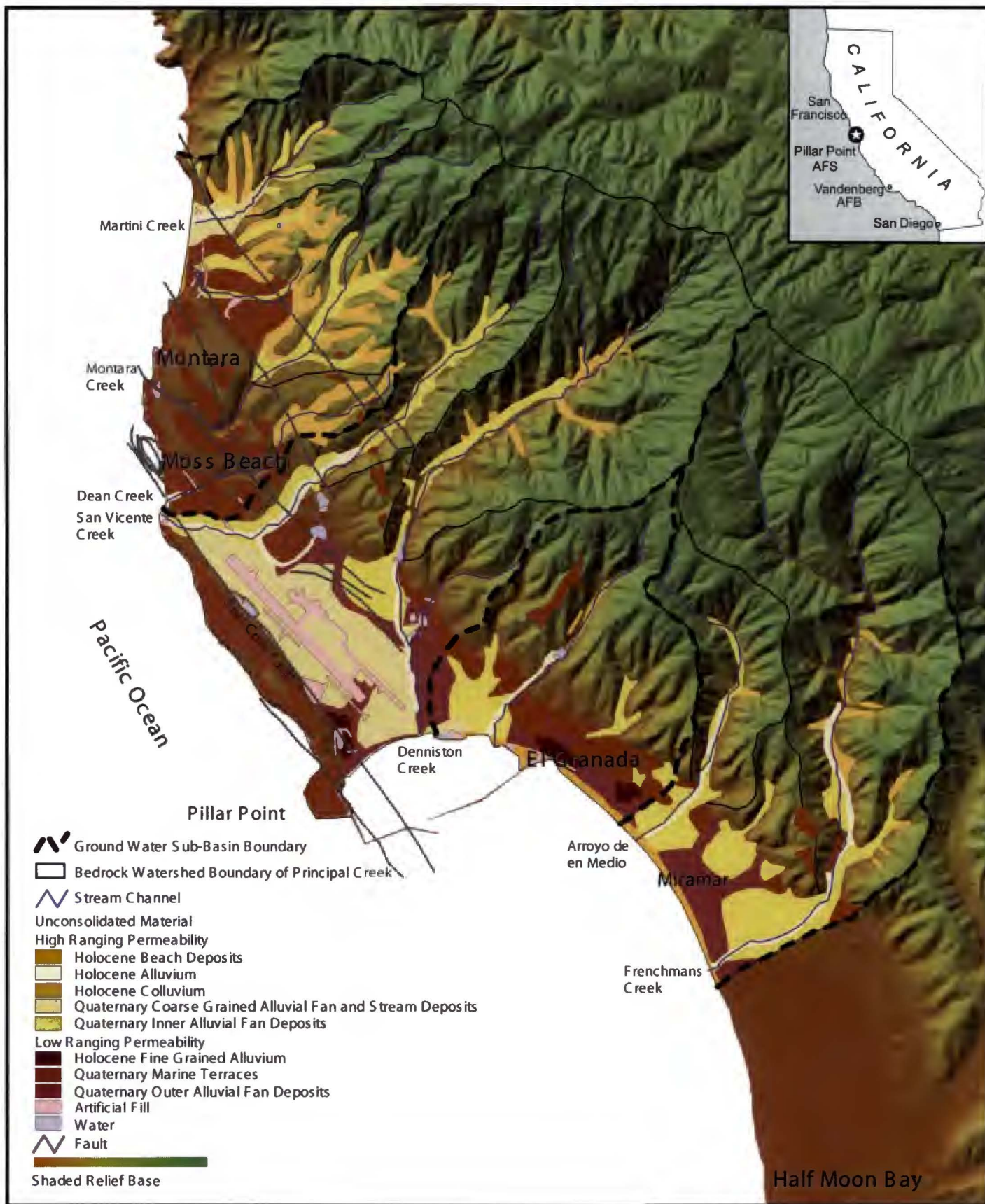
The active San Gregorio fault, locally known as the Seal Cove fault, and a number of related small-scale faults, project through Pillar Point AFS (Fugro 1999). The active San Andreas fault is located approximately 7 miles northeast of Pillar Point AFS and parallels the San Gregorio fault. The San Gregorio fault is part of the larger Hosgri fault system. The Hosgri fault, predominantly an offshore system, extends from about Point Arguello in Santa Barbara County to Bolinas Lagoon in Marin County where it merges with the San Andreas fault.

The San Gregorio-Hosgri fault zone at Pillar Point is thought to be at least 2.5 miles wide, although it varies along the length of the system (Fugro 1999). Small-scale features likely related to the San Gregorio fault can be seen in the seacliffs at Pillar Point AFS.

Movement along these known active faults (San Gregorio and San Andreas) would potentially affect the project area. No large earthquakes have occurred along the San Gregorio fault zone in the project area. However, the maximum estimated earthquake intensity for the Pillar Point AFS area is a 9 or 10 magnitude event (Fugro 1999). Earthquakes with intensities of 9 cause considerable structural damage, partial collapse of buildings, and fissures and cracks in the ground. Most masonry and frame structures are destroyed by earthquakes with an intensity of 10. In addition, the potential for surface fault rupture at Pillar Point AFS is considered very high as fault splays of the San Gregorio fault zone traverse Pillar Point (Fugro 1999).

In addition to potential structural damage, tsunamis and liquefaction are related to regional earthquake activity. The maximum elevation of tsunami inundation at the Pillar Point AFS is estimated at 40 feet above mean sea level (Fugro 1999). Pillar Point AFS is not likely to be inundated by tsunamis because it is at an elevation greater than 40 feet above mean sea level. The probability of liquefaction at Pillar Point AFS is also considered very low, as the rock material at the site is not prone to liquefaction and, historically, liquefaction has not occurred on Pillar Point AFS (Fugro 1999).

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Sources: (1) Geologic Map of San Mateo County, CA, Brabb & Pampeyan, 1983.  
 (2) Digital Elevation Model, USGS, for shaded relief base.



UNITED STATES AIR FORCE  
 VANDENBERG AIR FORCE BASE

### GEOLOGIC MAP



**TETRA TECH, INC.**  
 3201 Airpark Drive, Suite 108  
 Santa Maria, CA 93455

TASK NO.	DATE	DRAWN BY	DWG NO.	FIGURE
99130	10/22/09	RANDALL	7698	3-1

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### 3.4.2.3 Cliff Retreat

Cliff retreat along the coast of California occurs via landslides, usually in response to heavy rains or high surf. Cliff retreat north of Building 17 resulted in failure of 9 to 12 feet of seacliff during the winter of 1997-1998. Failure of the seacliff was likely due to scour of the toe of the seacliff during high tides. Fractures and fault spays related to the San Gregorio fault system project through the cliff face in this area and were observed west of the cliff face. These fractures and faults are planes of weakness along which the seacliff can fail. The current face of the seacliff north of Building 17 likely represents the exposed face of a fracture (Fugro 1999).

Based on past seacliff retreat north of Building 17, the seacliff retreat rate is estimated at 9.8 inches per year, which is exposed to wave action (Fugro 1999, Earth Systems 2009). The seacliff retreat rate for the eastern bluff, closest to the Proposed Action site, has not been estimated, however, it is situated within the Pillar Point Harbor breakwater, and is therefore, unlikely to be affected by wave action except in highly unusual circumstances (Earth Systems 2009). The eastern bluff was subjected to wave action prior to construction of the breakwater, which may have been a factor in the formation of existing landslides within that area of the seacliff (Earth Systems 2009).

### 3.4.2.4 Landslides

Landslides are also pervasive along the northwestern, southern, and eastern seacliffs surrounding Pillar Point AFS and vary in size from small surficial features to large, deep-seated landslides. A landslide north of the northern Loop Road is considered the most significant landslide at Pillar Point AFS. The landslide north of northern Loop Road is approximately 300 feet wide and 170 feet long. The landslide has moved downslope to the northwest and appears to be failing in the shale and mudstone of the Purisima Formation. The landslide failure may have been a reactivation of a preexisting landslide due to record rainfall during the 1997-1998 winter and/or possibly by wave erosion of the toe of the slope (Fugro 1999). Numerous inactive landslides are also present at the site, and do not exhibit geomorphic indicators of recent movement (Fugro 1999).

In 2010, Earth Systems performed a subsurface exploration in the vicinity of the eastern bluff, an area deemed critical for slope stability with respect to construction of roadside bioretention cells that will infiltrate storm water. Specifically, two borings were drilled with a truck-mounted bucket auger drilling rig. Core and bulk samples were taken and sent to a laboratory for testing. Additionally, both borings were down-hole logged by a Certified Engineering Geologist. Earth Systems interpretation and analysis of the data generated during the study concluded that the easternmost sections of the bioretention cells would be situated within the limits of an ancient landslide of marginal stability (Earth Systems 2010). Earth Systems' report is part of the administrative record for the EA. A copy of this report is available upon request to 30 CES/CEANQ (805-606-7541).

## 3.5 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

Hazardous materials and wastes are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. 9601-9675), the Toxic Substances Control Act (15 U.S.C. 2601-2671), the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901-6992), and Title 22 of the California Code of Regulations (CCR). In general, this includes substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health and welfare or to the environment when released into the environment. EO 12088, under the authority of the U.S. EPA, ensures that necessary actions are taken for the prevention, management,

### **3.0 Affected Environment**

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and abatement of environmental pollution from hazardous materials or hazardous waste caused by federal facility activities. Hazardous wastes that are of special concern in demolition projects at Pillar Point AFS are polychlorinated biphenyls (PCBs) (which may be present in fluorescent light ballasts, electrical transformers and heat stabilized hydraulic oils), asbestos, lead-based paint (LBP), and zinc, chromium, and other metals in exterior coatings.

#### **3.5.1 Hazardous Materials Management**

Pillar Point AFS uses a variety of hazardous materials to accomplish mission support activities. These materials range greatly in hazard potential. Some solvents used for equipment maintenance have been classified as hazardous for their recognized potential to cause cancer. Diesel fuel stored in above ground storage tanks for backup power generators is hazardous due to its flammability. However, more common and less toxic materials such as exterior paint are also classified as hazardous.

Per Air Force regulations, Vandenberg AFB requires all organizations using hazardous materials on Vandenberg AFB and Vandenberg AFB's remote facilities including Pillar Point AFS, to obtain their hazardous materials through the HAZMART, a base function that centrally manages the procurement of hazardous materials per Air Force Instruction (AFI) 32-7086, *Hazardous Materials Management*, and 30 SW Plan 32-7086, *Hazardous Materials Management Plan*. Specifically, the HAZMART approves the use of hazardous materials on Vandenberg AFB only after the composition of the commodity and how it is to be used are reviewed to ensure compliance with environmental, safety, and occupational health regulations and policies.

#### **3.5.2 Lead-Based Paint and Materials Containing Lead**

Lead-, mercury-, and chromium-based paints were commonly used from the 1950s until recently. In particular, LBP was commonly used before 1978 in construction because of its durability. Typically, LBP was used in high-wear areas such as doors, window sills, and exterior surfaces exposed to the weather. Pillar Point AFS is a remote site of Vandenberg AFB and therefore, is subject to the *30th Space Wing Vandenberg AFB Lead Based Paint Management Plan (LBPMP)* per U.S. Air Force (1997); this plan provides specific direction in LBP abatement. The LBPMP contains strategies to identify, evaluate, and eliminate lead pursuant to lead based paint standards, protect facility occupants and workers from LBP hazards, and properly dispose of lead-containing waste.

#### **3.5.3 Asbestos**

Asbestos is the common name for a naturally occurring mineral group that forms small but strong fibers when crushed. Asbestos was used for its insulation properties, strength, chemical and friction resistance, condensation control, and non-combustibility. When asbestos is friable, or easily crumbled, it can become airborne and cause a serious health threat (BAAQMD 1997). Buildings that were constructed before 1980 most likely contain asbestos in the building materials (BAAQMD 1997). Pipelines can also contain asbestos.

The U.S. EPA, Occupational Safety and Health Administration (OSHA), and the BAAQMD define asbestos-containing material (ACM) as any material or product that contains greater than one percent asbestos. The California OSHA defines ACM as any manufactured construction material that contains more than 0.1 percent asbestos (CCR Title 8, Section 1529, Article 4).

Vandenberg AFB has published 30 SW Plan 32-1052 *Asbestos Management and Operating Plan*, which detail policies and procedures for managing ACMs. These policies and procedures are required to protect

the health of personnel and to comply with applicable federal, state, local, and DoD regulations. Because Pillar Point AFS is a remote site of Vandenberg AFB, it is subject to 30 SW Plan 32-1052 per U.S. Air Force (2009).

### 3.5.4 IRP Sites and AOCs

There are no Installation Restoration Program (IRP) sites on Pillar Point AFS. One Area of Concern (AOC) is located on Pillar Point AFS, AOC 19-PPA, which includes Building 17 (the Radar Tower Building), tt-PP-area-1 (a construction debris waste area), and former sandblast debris areas (Tetra Tech 1999). Building 17 is located on the west side of Pillar Point AFS, outside of the Proposed Action site and Alternative 1 site areas, and has historically been used as a warehouse, a classroom, administrative offices, and a tracking station. This facility is considered an AOC because spills have occurred at Building 17. One spill occurred on December 14, 1990, involving 1 gallon of Shell Diala oil from a filter press and another occurred on June 25, 1991, involving 5 gallons of an ethylene glycol and water mixture from a heat exchanger. In 1994, it was discovered that the radar transmitter in this building contained dielectric oil with a low concentration of PCBs. No remedial action was taken; however, additional investigation was recommended prior to any construction activities in this area (SAIC 1994b, Wolff 1998).

Soil contamination has occurred at Pillar Point AFS (SAIC 1994c). Routine corrosion control activities, such as sandblasting and the use of industrial coatings containing heavy metals, were identified as the main source of inorganic soil contaminants. In October 1993, a soil sampling program was conducted (SAIC 1994c). Soil samples contained elevated levels of heavy metals, including lead, cadmium, nickel, and zinc. Soil removal and remediation were undertaken in 1993–1994. A Preliminary Endangerment Assessment was then prepared and submitted to the California Department of Toxic Substances Control (DTSC). It was concluded in this report that there is little threat to human health or the environment due to the limited exposure pathways and low concentrations (SAIC 1994c). Since soil remediation, Pillar Point has modified procedures for corrosion control and paint restoration to include capture of sandblast grit and paint chips for disposal off-site (Rudd 2009).

### 3.5.5 Hazardous Waste Management

Management of hazardous waste at Pillar Point AFS must comply with RCRA Subtitle C (40 CFR Parts 260–279) regulations administered by U.S. EPA, unless otherwise exempted through CERCLA actions. Hazardous wastes at Pillar Point AFS are also regulated by DTSC under the California Health and Safety Code, Sections 25100 through 67188. These regulations require that wastes be handled, stored, transported, disposed of, or recycled according to defined procedures. The 30 SW Plan 32-7043-A, *Hazardous Waste Management Plan (HWMP)*, details the procedures to be followed for hazardous waste disposal on Pillar Point AFS.

Pillar Point AFS is classed as a Small Quantity Generator due to the limited quantities of hazardous wastes generated by daily operations. These wastes, in volumes that vary yearly, include quantities of diesel fuel, fuel filters, waste batteries, waste paint, and absorbents. However, during operations which might generate quantities of waste sufficient to qualify Pillar Point as a Large Quantity Generator, such as during periodic sandblasting and painting or similar modification or retrofit programs, Pillar Point AFS in the past has been authorized to manage the wastes as a Large Quantity Generator following the guidelines of the Vandenberg AFB HWMP. Hazardous waste can then only be stored at the generator's pre-approved Collection Accumulation Point for no more than 90 days. On or before the 90th day of storage, the hazardous waste must be shipped off-station for disposal.

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#### **3.6 LAND USE**

Pillar Point AFS occupies most of the land forming the Pillar Point peninsula on the northwestern edge of Half Moon Bay in unincorporated San Mateo County. Access to Pillar Point AFS is via West Point Avenue through the town of Princeton-by-the-Sea. The site is currently used to support communications and tracking functions associated with U.S. Air Force missile launch activities from Vandenberg AFB.

All of the immediately adjacent lands are either beach, saltmarsh, seasonal freshwater marsh, or other vacant open space dedicated as natural reserve or used informally as recreational land (SAIC 1994d). Tidepooling, picnicking, marine mammal watching, and pier and shore fishing are popular along San Mateo County's beaches. As described in Section 3.7, Natural Resources, the marine environment bordering Pillar Point AFS to the north, south, and west is noted for its diverse marine life as part of the James V. Fitzgerald Marine Reserve, an ASBS, and the Monterey Bay National Marine Sanctuary. The West Beach Trail extends 0.5 mile to the south of Pillar Point AFS along Pillar Point Harbor to a sandy beach, which at low tides connects north to the James V. Fitzgerald Marine Reserve. In addition, the offshore area is known by surfers as "Mavericks," and is popular for its large and powerful waves.

The Proposed Action is in the coastal zone, and therefore subject to the Coastal Zone Management Act (CZMA) of 1972. The CZMA is the federal law that protects the nation's coastlines. Section 106(d)(6) of the CZMA gave the California Coastal Commission (CCC) authority over activities occurring within the coastal zone. The CCC subsequently developed the California Coastal Management Program, the key policy component of the program being the California Coastal Act. The Coastal Act established the CCC as a permanent state coastal management and regulatory agency. The CCC assures the public concerns of statewide importance are reflected in local decisions regarding coastal development. Coastal Act policies include:

- Providing for maximum public access to the coast;
- Protecting marine and land resources including environmentally sensitive habitat areas such as wetlands, riparian corridors and creeks, rare and endangered species habitat, and marine habitat such as tidepools;
- Protecting the scenic beauty of the coastal landscape;
- Maintaining productive coastal agricultural lands; and
- Locating coastal energy and industrial facilities and other development where they will have the least adverse impact.

Policies of the California Coastal Act that are applicable to the Proposed Action are as follows:

#### **Section 30230: Marine Resources; Maintenance**

*Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231: Biological Productivity; Water Quality

*The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Section 30253(a) and (b): Minimization of Adverse Impacts

*New development shall do all of the following:*

- (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
- (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

In addition to the above policies, the following Coastal Act policy applies to Alternative 1 that involves potential effects on Princeton Marsh, which is considered an environmentally sensitive habitat area:

Section 30240: Environmentally Sensitive Habitat Areas; Adjacent Developments

- (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
- (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

Coastal Consistency Determinations must be completed for all federal actions conducted within or potentially affecting coastal resources within the coastal zone pursuant to the CZMA and following the procedures outlined in the National Oceanic and Atmospheric Administration's (NOAA) Federal Consistency Regulations (15 CFR 930). A Negative Determination would be prepared if a proposed action would not affect coastal resources. As required by 15 CFR § 930.57(b), for projects requiring a Coastal Consistency Determination, Vandenberg AFB must prepare and submit a Coastal Consistency Determination to the Coastal Commission that contains findings that the proposed project is consistent with the enforceable policies of the California Coastal Act to the maximum extent practicable. The NEPA document for the project is incorporated by reference into the Coastal Consistency Determination and provides the basis for this finding.

### 3.7 NATURAL RESOURCES

Natural resources include terrestrial and aquatic ecosystems and the plants and animals that occur throughout these ecosystems. On November 1-2, 2007, Ms. Michelle Bates and Ms. Heather Moine,

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biologists with Tetra Tech, Inc., performed, site visits at the Proposed Action and Alternative 1 sites to map the plant communities and to conduct a general survey of the plants and wildlife occurring in these areas. On November 27, 2007 and December 11, 2007, Ms. Kelly Bayer and Ms. Meredith Zaccherio, biologists with Tetra Tech, Inc., performed a wetlands delineation. The site visits also included surveys for plant and wildlife species with special status (or "special-status" species) and sensitive habitats such as wetlands. A query of the California Department of Fish and Game's (CDFG) Natural Diversity Data Base (CNDDB) within the Half Moon Bay and Montara 7.5 Minute U.S. Geological Survey Quadrangles, as well as within San Mateo County, was also performed to determine the potential occurrence of special-status species and habitats within the Proposed Action and Alternative 1 sites.

#### 3.7.1 Regional Biological Setting

The James F. Fitzgerald Marine Reserve, a California State reserve, is located along the coast to the west and north of Pillar Point AFS, and Pillar Point Harbor and Princeton Marsh are located to the southeast and east, respectively. The reserve is designated as an ASBS in the COP due to its unique underwater habitat and extensive tide pools. Since its designation as an ASBS in 1974, 25 new species have been discovered on the reserve.

The James F. Fitzgerald Marine Reserve is also part of the Monterey Bay National Marine Sanctuary, a 6,094 square-mile federally protected marine area off the California coast between Marin and Cambria. The sanctuary is managed by the NOAA and is one of the world's most diverse marine ecosystems, supporting 33 species of mammals, 94 species of seabirds, 345 species of fish, and numerous invertebrates and plants.

#### 3.7.2 Habitat

Coastal terrace prairie is the primary vegetation community found in the location of the proposed bioretention cell alongside the Loop Road under the Proposed Action and Alternative 1 (Santa Barbara Museum of Natural History 2000). This habitat consists primarily of grasses and other herbaceous species. Dominant species include the native grass, one-sided bluegrass (*Poa secunda* ssp. *secunda*), and non-native grasses such as slender wild oat (*Avena barbata*), Italian rye-grass (*Lolium multiflorum*), and soft chess (*Bromus hordaceus*). Other dominant herbaceous species may include beach strawberry (*Fragaria chiloensis*), gumplant (*Grindelia stricta*), coast tarweed (*Madia sativa*), English plantain (*Plantago lanceolata*), birdfoot trefoil (*Lotus corniculatus*) and bristly ox-tongue. Non-native grassland occurs in the proposed location of the bioretention cells between Buildings 1 and 10. A group of Monterey cypress (*Cupressus macrocarpa*) and myoporum (*Myoporum* sp.) occurs near the center of the station, adjacent to but outside the area that would be directly affected by implementation of the proposed project.

Sandy beach and rocky intertidal habitats in the James F. Fitzgerald Marine Reserve are found below the cliffs of the Pillar Point AFS, where storm water is currently routed and where it would continue to be routed under the Proposed Action. The beaches and tidal pools in the Reserve provide habitat for numerous plants and animals, including macrophytic algae and kelp that support a diverse assemblage of fish and invertebrate species.

Additionally, coastal scrub, coastal terrace prairie, and coastal brackish marsh habitats are located in the area of potential effect of Alternative 1. Disturbed coastal scrub and coastal terrace prairie occur along West Point Avenue where asphalt channels would be improved. The coastal scrub includes pampas grass (*Cortaderia selloana*), California sagebrush (*Artemisia californica*), coyote bush (*Baccharis pilularis*), fennel (*Foeniculum vulgare*), lupine (*Lupinus* sp.), wild strawberry (*Fragaria vesca*), and iceplant

(*Carpobrotus edulis*). The coastal terrace prairie includes native and non-native grasses, pampas grass, and iceplant. Princeton Marsh, where stormwater would be routed under Alternative 1, is a coastal brackish marsh and is dominated by rushes (*Juncus* spp.) and cattail (*Typha latifolia*). California blackberry (*Rubis vitifolius*), arroyo willow (*Salix lasiolepis*) and pampas grass (*Cortaderia jubata*) were also observed during the survey at the storm water outlet to Princeton Marsh, and Monterey cypress (*Cupressus macrocarpa*) trees are located adjacent to West Point Avenue in the Alternative 1 area.

### 3.7.3 Wildlife

There is potential for a diverse assemblage of wildlife species at the site due to its proximity to a variety of habitat types, including marine, wetland, and upland habitats. Bird species observed at Pillar Point AFS during a site visit on November 2, 2007 include song sparrow (*Melospiza melodia*), American crow (*Corvus brachyrhynchos*), and red-tailed hawk (*Buteo jamaicensis*). Mature Monterey cypress (*Cupressus macrocarpa*) trees and cliffs near the proposed project provide potential habitat for nesting birds, bats, and insects. Additionally, the sandy beach and rocky intertidal habitat at the storm water outfall to the ASBS under the Proposed Action support a diverse assemblage of shorebirds and invertebrate communities. The area of Princeton Marsh to which storm water would be routed under Alternative 1 also supports a diverse wildlife community.

### 3.7.4 Special-Status Biological Resources

The following are considered "special-status biological resources:"

- Plant and wildlife species that are federally listed, proposed listed, or candidates for listing;
- Plant and wildlife species that are State-listed or candidates for listing;
- Plant species listed as sensitive by the California Native Plant Society (CNPS);
- Wildlife species considered "species of special concern" (CSC) by the CDFG;
- Plant communities considered sensitive by the CDFG;
- Marine mammals protected under the Marine Mammal Protection Act (MMPA); and
- Nesting birds protected by the Migratory Bird Treaty Act.

The federal Endangered Species Act (ESA) of 1973, as amended (16 U.S. Code [U.S.C.] 1531 *et seq.*), requires the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to identify species of wildlife and plants that are endangered (FE), threatened (FT), or proposed endangered (FPE) or threatened (FPT), based on the best scientific and commercial data available. In addition, species that are being considered for federal listing are known as candidates (FC).

The California Endangered Species Act (CESA) also requires the CDFG to identify plant and wildlife species that are listed as rare (for plants only) (SR), threatened (ST), or endangered (SE), or are candidates for listing (SC).

Although not protected by law, sensitive plant species are also tracked by the CNPS which maintains a list of these species in five main categories and three subcategories for their threat ranking. List 1A species are presumed extinct in California; List 1B species are rare or endangered in California and elsewhere. List 2 species are rare or endangered in California but are more common elsewhere. List 3 species include those for which more information is needed. List 4 plants are those with limited distribution. For each list, there are also three possible threat codes: (1) .1 for seriously endangered in California, (2) .2 for fairly endangered in California, and (3) .3 for not very endangered in California.

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Although not protected by law, the status of other sensitive non-listed or candidate wildlife species are tracked by the CDFG and are called CSC. CDFG also identifies and tracks sensitive plant communities in the state.

Vandenberg AFB is subject to the requirements of the federal ESA. Section 7 of the ESA requires federal agencies to consult with the USFWS and the NMFS to ensure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of federal endangered species and threatened species. Although not subject to the requirements of CESA, as a goal of its Integrated Natural Resources Management Plan, Vandenberg AFB also protects and conserves species and plant communities considered sensitive by the State.

Vandenberg AFB is also subject to the requirements of the MMPA (16 U.S.C. 1361 *et seq.*), which regulates the incidental take of marine mammals, and the Migratory Bird Treaty Act (16 U.S.C. 703-712), which protects native migratory birds, including their eggs, active nests, and young.

There is the potential for special-status species to be present on the site, though none were observed during site surveys. Species listed in Table 3-4 (Plants) and Table 3-5 (Wildlife) have been observed near Pillar Point AFS and could potentially occur within the habitat present at the Proposed Action site. These species include plants and animals listed in the CNDDDB and other special-status species that may be expected to occur in coastal terrace prairie or marine habitats. Tables 3-6 and 3-7 present those plant and wildlife species that may be expected to occur in coastal terrace prairie, coastal scrub, and coastal brackish marsh habitats and therefore could occur in the area of potential effect of Alternative 1. Descriptions are given below for each of these species along with a discussion of the likelihood for each species to occur at the Proposed Action site and Alternative 1 site.

In addition, many bird species could nest on the cliffs next to the Proposed Action site and in Princeton Marsh adjacent to the Alternative 1 site. In the past, pelagic cormorants (*Phalacrocorax pelagicus*) and pigeon guillemots (*Cepphus columba*) have been documented to nest on the west cliff of Pillar Point AFS (SAIC 1994b; SOWLS et al. 1989; USGS 1989-1991). Pelagic cormorants nest in large colonies from April to August or September. Pigeon guillemots lay eggs from April to June and young are fledged starting June through August or September. The double-crested cormorant (*Phalacrocorax auritus*) has also been observed to roost in and near Pillar Point Harbor (Point Reyes Bird Observatory 2009) and has the potential to nest on the cliffs of Pillar Point AFS. The double-crested cormorant breeds from April to July or August. Birds could also nest in coastal terrace prairie habitat located on the bluff top in the area of the proposed bioretention cell along the Loop Road under both the Proposed Action and Alternative 1. The Migratory Bird Treaty Act prohibits the "take" of nesting birds, including their nests, eggs, and young, where "take" is defined as to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, or possess."

**Table 3-4**  
**Special-Status Plant Species that Occur in Habitat Present at the Proposed Action Site**

SCIENTIFIC NAME	COMMON NAME	STATUS			HABITAT REQUIREMENTS
		Federal	State	CNPS	
<i>Centromadia parryi</i> ssp. <i>parryi</i>	Pappose tarplant	None	None	1B	Coastal prairie, meadows and seeps, coastal salt marsh, valley and foothill grassland.
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	San Francisco Bay spineflower	None	None	1B	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub.
<i>Fritillaria liliacea</i>	Fragrant fritillary	None	None	1B	Coastal scrub, valley and foothill grassland, coastal prairie
<i>Horkelia marinensis</i>	Point Reyes horkelia	None	None	1B	Coastal dunes, coastal prairie, coastal scrub
<i>Leptosiphon croceus</i>	Coast yellow leptosiphon	None	None	1B	Coastal bluff scrub, coastal prairie
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	Choris' popcorn-flower	None	None	1B	Chaparral, coastal scrub, coastal prairie
<i>Silene verecunda</i> ssp. <i>verecunda</i>	San Francisco champion	None	None	1B	Coastal scrub, valley and foothill grassland, coastal bluff scrub, chaparral, coastal prairie
<i>Triphysaria floribunda</i>	San Francisco owl's clover	None	None	1B	Coastal prairie, valley and foothill grassland

**Notes:** FE Federally listed Endangered

SE State listed Endangered

1B California Native Plant Society listed plants that are rare or endangered in California and elsewhere

**Source:** CDFG. 2007 California Natural Diversity Data Base, Search of the Half Moon Bay and Montara 7.5 minute USGS Quadrangles (15 Nov 2007), and Search of San Mateo County (October 2009).

**Table 3-5**  
**Special-Status Wildlife Species that Occur in Habitat Present at the Proposed Action Site**

SCIENTIFIC NAME	COMMON NAME	STATUS			HABITAT REQUIREMENTS
		Federal	State	CDFG	
Invertebrates					
<i>Plebejus icarioides missionensis</i>	Mission blue butterfly	FE	None	None	Inhabits grasslands of the San Francisco peninsula.
<i>Danaus plexippus</i>	Monarch butterfly	None	None	Tracked	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.
<i>Callophrys mossii bayensis</i>	San Bruno elfin butterfly	FE	None	None	Coastal, mountainous areas with grassy ground cover.
Fish					
<i>Oncorhynchus mykiss irideus</i>	Steelhead - central California coast ESU	FT	None	None	Anadromous; Spawns in freshwater but spends most of its live in ocean habitat.
Birds					
<i>Athene cunicularia</i>	Burrowing owl	None	None	CSC	Grassland and desert habitats.
<i>Pelecanus occidentalis californicus</i>	California brown pelican	FE	SE	None	Roosts on rocky cliffs and coastal bluffs of offshore islands.
Terrestrial Mammals					
<i>Taxidea taxus</i>	American Badger	None	None	CSC	Shrub, forest and herbaceous habitats with friable soils.
<i>Antrozous pallidus</i>	Pallid Bat	None	None	CSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting.
Pinnipeds					
<i>Phoca vitulina</i>	Pacific harbor seal	MMPA	None	None	Fairly common, non-migratory pinnipeds found on California islands and known to haul out and breed along entire mainland coast. Prefer to remain close to shore in subtidal and intertidal habitats. Often swim into bays and estuaries, and sometimes venture into rivers in northern California. Frequently haul out in small to moderate-sized groups on emergent offshore and tidal rocks, mudflats, sandbars, and sandy beaches (CDFG 2009).

**Table 3-5 (cont.)  
Special-Status Wildlife Species that Occur in Habitat Present at the Proposed Action Site**

<i>Eumetopias jubatus</i>	Steller sea lion	FT, MMPA	None	None	Haul out on coastal islands and occasionally on offshore rocks on the mainland. The largest breeding colony for the species is located at Año Nuevo Island near Santa Cruz (CDFG 2009).
<i>Mirounga angustirostris</i>	Northern elephant seal	MMPA	None	None	Haul out on coastal islands, on offshore rocks, and on the mainland. One of the largest breeding colonies for the species is located at Año Nuevo Island and on the mainland at Año Nuevo near Santa Cruz (CDFG 2009).
<i>Enhydra lutris nereis</i>	Southern sea otter	FT, MMPA	None	None	Found in nearshore marine environments of California from Año Nuevo, San Mateo County to the Channel Islands. Canopies of giant kelp and bull kelp provide important rafting and feeding areas for this species.
<i>Zalophus californianus</i>	California sea lion	MMPA	None	None	Haul out on offshore rocks, sloping rock outcroppings, sandy and cobblestone beaches, jetties, and buoys. Not expected to breed in proposed project area.
<b>Cetaceans</b>					
<i>Eschrichtius robustus</i>	Gray whale	DL, MMPA	None	None	Occur in open ocean, but occasionally occur near shore.
<i>Megaptera novaeangliae</i>	Humpback whale	FE, MMPA	None	None	Occur in open ocean, but occasionally occur near shore.

**Notes:** FE Federally listed Endangered  
SE State Endangered  
FT Federally listed Threatened  
DL Federally delisted  
MMPA Protected under the Marine Mammal Protection Act  
CSC CDFG Species of Special Concern  
ESU Evolutionarily significant unit

**Source:** CDFG. 2007 California Natural Diversity Data Base, Search of the Half Moon Bay and Montara 7.5 minute USGS Quadrangles, (15 Nov 2007), and Search of San Mateo County (October 2009).

**Table 3-6**  
**Special-Status Plant Species that Occur in Habitat Present Within the Alternative 1 Site**

SCIENTIFIC NAME	COMMON NAME	STATUS			HABITAT REQUIREMENTS
		Federal	State	CNPS	
<i>Arctostaphylos montaraensis</i>	Montara manzanita	None	None	1B	Chaparral, coastal scrub.
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	Coastal marsh milk-vetch	None	None	1B	Coastal dunes, salt marshes.
<i>Centromadia parryi</i> ssp. <i>parryi</i>	Pappose tarplant	None	None	1B	Coastal prairie, meadows and seeps, coastal salt marsh, valley and foothill grassland.
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	San Francisco Bay spineflower	None	None	1B	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub.
<i>Cirsium andrewsii</i>	Franciscan thistle	None	None	1B	Coastal bluff scrub, broadleaved upland forest, coastal scrub.
<i>Collinsia multicolor</i>	San Francisco collinsia	None	None	1B	Closed-coned coniferous forest, coastal scrub.
<i>Fritillaria liliacea</i>	Fragrant fritillary	None	None	1B	Coastal scrub, valley and foothill grassland, coastal prairie.
<i>Grindelia hirsutula</i> var. <i>maritima</i>	San Francisco gumplant	None	None	1B	Coastal scrub, coastal bluff scrub, valley and foothill grassland.
<i>Horkelia cuneata</i> ssp. <i>sericea</i>	Kellogg's horkelia	None	None	1B	Closed-coned coniferous forest, coastal scrub, chaparral.
<i>Horkelia marinensis</i>	Point Reyes horkelia	None	None	1B	Coastal dunes, coastal prairie, coastal scrub.
<i>Leptosiphon croceus</i>	Coast yellow leptosiphon	None	None	1B	Coastal bluff scrub, coastal prairie.
<i>Leptosiphon rosaceus</i>	Rose leptosiphon	None	None	1B	Coastal bluff scrub.
<i>Malacothamnus davidsonii</i>	Davidson's bush mallow	None	None	1B	Coastal scrub, riparian woodland, chaparral.
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	Choris' popcorn-flower	None	None	1B	Chaparral, coastal scrub, coastal prairie.
<i>Potentilla hickmanii</i>	Hickman's cinquefoil	FE	SE	1B	Coastal bluff scrub, closed-coned coniferous forest, meadows and seeps, marshes and swamps.

**Table 3-6 (cont.)**  
**Special-Status Plant Species that Occur in Habitat Present Within the Alternative 1 Site**

<i>Silene verecunda</i> ssp. <i>verecunda</i>	San Francisco campion	None	None	1B	Coastal scrub, valley and foothill grassland, coastal bluff scrub, chaparral, coastal prairie.
<i>Triphysaria floribunda</i>	San Francisco owl's clover	None	None	1B	Coastal prairie, valley and foothill grassland.

**Notes:** CNPS California Native Plant Society

FE Federally listed Endangered

SE State listed Endangered

1B California Native Plant Society listed plants are rare, threatened or endangered in California and elsewhere

**Source:** CDFG. 2007 California Natural Diversity Data Base, Search of the Half Moon Bay and Montara 7.5 minute USGS Quadrangles (15 Nov 2007), and Search of San Mateo County (October 2009).

**Table 3-7**  
**Special-Status Wildlife Species that Occur in Habitat Present Within the Alternative 1 Site**

SCIENTIFIC NAME	COMMON NAME	STATUS			HABITAT REQUIREMENTS
		Federal	State	CDFG	
Invertebrates					
<i>Plebejus icarioides missionensis</i>	Mission blue butterfly	FE	None	None	Inhabits grasslands of the San Francisco peninsula.
<i>Danaus plexippus</i>	Monarch butterfly	None	None	Tracked	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.
<i>Callophrys mossii bayensis</i>	San Bruno elfin butterfly	FE	None	None	Coastal, mountainous areas with grassy ground cover.
Amphibians and Reptiles					
<i>Rana aurora draytonii</i>	California red-legged frog	FT	None	CSC	Lowlands and foothills in or near permanent sources of deep water with riparian vegetation.
<i>Thamnophis sirtalis tetrataenia</i>	San Francisco garter snake	FE	SE	None	Vicinity of freshwater marshes, ponds, and slow moving streams. Upland habitats also important.
Birds					
<i>Athene cunicularia</i>	Burrowing owl	None	None	CSC	Grassland and desert habitats.

**Table 3-7 (cont.)**  
**Special-Status Plant Species that Occur in Habitat Present Within the Alternative 1 Site**

<i>Melospiza melodia pusillula</i>	Alameda song sparrow	None	None	CSC	Salt marshes; nests low in <i>Grindelia</i> bushes and in <i>Salicornia</i> .
<i>Pelecanus occidentalis californicus</i>	California brown pelican	FE	SE	None	Roosts on rocky cliffs and coastal bluffs of offshore islands.
<i>Rallus longirostris obsoletus</i>	California clapper rail	FE	SE	None	Salt water and brackish marshes and tidal sloughs.
<i>Geothlypis trichas sinuosa</i>	Saltmarsh common yellowthroat	None	None	CSC	Fresh and salt water marshes with thick, continuous cover for foraging; tall grasses, tule patches, willows for nesting.
<b>Mammals</b>					
<i>Taxidea taxus</i>	American Badger	None	None	CSC	Shrub, forest and herbaceous habitats with friable soils.
<i>Antrozous pallidus</i>	Pallid bat	None	None	CSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting.

**Notes:** FE Federally listed Endangered  
 FT Federally listed Threatened  
 SE State listed Endangered  
 CSC CDFG designated Species of Special Concern

**Source:** CDFG. 2007 California Natural Diversity Data Base, Search of the Half Moon Bay and Montara 7.5 minute USGS Quadrangles (15 Nov 2007) and Search of San Mateo County (October 2009).

### 3.0 Affected Environment

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#### 3.7.4.1 Special-Status Plant Species that Occur in Habitat Present Within the Proposed Action or Alternative 1 Sites

**Montara manzanita (*Arctostaphylos montaraensis*).** This evergreen shrub is a member of the Ericaceae family and occurs in chaparral and coastal scrub communities. It is endemic to California and blooms January through March at elevations of 150 to 500 meters. This species is included in the CPNS List 1B.2, and has been observed near Montara Mountain in San Mateo County. The species could occur in coastal scrub habitat in the Alternative 1 site, however, no manzanita species was observed during the site visit conducted for the proposed project. Therefore, this species was confirmed to not occur in the Alternative 1 site.

**Coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*).** This perennial herb is endemic to California and occurs in coastal dunes and salt marshes. It is in the Asteraceae family and also on the CPNS List 1B.2. It blooms April through October and occupies an elevation range from 0 to 30 meters. This species has been observed at Pillar Point near Princeton Marsh. Therefore, this species has a high to moderate chance of being directly and/or indirectly impacted by Alternative 1.

**Pappose tarplant (*Centromadia parryi* ssp. *parryi*).** This annual herb occurs in coastal prairies, meadows and seeps, coastal salt marshes, and valley and foothill grassland habitat. It blooms May through November in elevations of 2 to 420 meters. The species is often found in alkaline soils. It is on the CPNS List 1B.2. The species could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites. This species was not observed along West Point Avenue during site visits for the proposed project, however, this species could occur in coastal terrace prairie habitat alongside the Loop Road.

**San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*).** This annual herb occurs in coastal bluff scrub, coastal dune, and coastal prairie habitats. It typically blooms April through July at elevations of 3 to 215 meters. It is in the Asteraceae family. This species is on the CNPS List 1B.2 and has been found at in San Mateo County at Laguna Salada, west of the town of Pacifica. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites and in coastal scrub habitat in the Alternative 1 site.

**Franciscan thistle (*Cirsium andrewsii*).** This perennial herb occurs in coastal bluff scrub, broadleaved upland forests, and coastal scrub at elevations of 1 to 150 meters. It blooms March through July. The species is on the CNPS List 1B.2, and has been observed near Point San Pedro and Montara Mountain north of Pillar Point. This species (nor any unknown thistle species) was not observed during site visits for the proposed project; therefore, it is not likely to occur in coastal scrub habitat of the Alternative 1 site.

**San Francisco collinsia (*Collinsia multicolor*).** This annual herb is in the Scrophulariaceae family and is found in closed-coned coniferous forests and coastal scrub communities. It blooms March through May at elevations of 30 to 250 meters. The species is on the CNPS List 1B.2 and has been found in various parts of San Mateo, Monterey, Santa Clara, Santa Cruz, and San Francisco counties. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal scrub habitat in the Alternative 1 site.

**Fragrant fritillary (*Fritillaria liliacea*).** This bulbiferous herb is also in the Liliaceae family. It blooms February through April at elevations of 3 to 410 meters. The species can be found in cismontane woodland, coastal prairie, coastal scrub, or valley and foothill grassland habitats. It is on the CNPS List

1B.2 and has been identified near Hillsborough and near Pillarcitos Creek, far east of Pillar Point. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites and in coastal scrub habitat in the Alternative 1 site.

**San Francisco gumplant (*Grindelia hirsutula* var. *maritima*).** This perennial herb is in the Asteraceae family and blooms June through September at elevations of 15 to 400 meters. It is found in coastal bluff scrub, coastal scrub, or valley and foothill grasslands. The species is on the CNPS List 1B.2 and has been identified on an ocean bluff about 7.5 miles north of Half Moon Bay. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal scrub habitat in the Alternative 1 site.

**Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*).** This perennial herb is in the Rosaceae family and is found in closed cone coniferous forests, coastal scrub, and chaparral. It occurs in old dunes, coastal sand hills, and openings from 10 to 200 meters. It blooms April to September. This species is on the CNPS List 1B.1 as seriously endangered in California. It has been observed in grassland habitat 1.5 miles east of Half Moon Bay, at the watershed divide between Frenchman's Creek Drainage and Apanilio Creek. *Horkelia* spp. were not observed during site visits for the proposed project, therefore, it is not likely to occur in coastal scrub habitat of the Alternative 1 site.

**Point Reyes horkelia (*Horkelia marinensis*).** This perennial herb is also in the Rosaceae family. It is found in coastal dunes, coastal prairie, and coastal scrub. It occurs in sandy flats and dunes in grassland or scrub communities near the coast. It blooms May through September at elevations of 3 to 30 meters. This species is on the CNPS List 1B.2 and was observed at Junipero Serra Park near San Bruno. *Horkelia* spp. were not observed during site visits for the proposed project; therefore, it is not likely to occur in coastal scrub habitat or coastal terrace prairie habitat of the Alternative 1 site. However, the species could occur in coastal terrace prairie habitat along the Loop Road at the Proposed Action site.

**Coast yellow leptosiphon (*Leptosiphon croceus*).** This annual herb is in the Polemoniaceae family and is found in coastal bluff scrub and coastal prairie habitats between 10 and 150 meters. It blooms in April and May. This species is on the CNPS List 1B.1 and has been documented as occurring near Point San Pedro and Vallemar Bluff above Moss Beach, just northwest of Pillar Point AFS. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites and in coastal scrub habitat in the Alternative 1 site.

**Rose leptosiphon (*Leptosiphon rosaceus*).** This annual herb is also in the Polemoniaceae family and is found in coastal bluff scrub at elevations between 0 and 100 meters. It blooms April through July. This species is on the CNPS List 1B.1 and has been observed near Pillar Point AFS on the bluff over Moss Beach. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal scrub habitat in the Alternative 1 site.

**Davidson's bush mallow (*Malacothamnus davidsonii*).** This deciduous herb is in the Malvaceae family and grows in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. It is typically found near granitic outcrops in sandy bare soil at elevations of 180-855 meters. It blooms June through January and is on the CNPS List 1B.2. This species has been observed in San Mateo County near Spring Valley, but at elevations higher than Pillar Point AFS. This species was not observed during site visits conducted for the proposed project. Therefore, this species does not occur at the Alternative 1 site.

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**Choris' popcorn-flower (*Plagiobothrys chorisianus* var. *chorisianus*).** This annual herb is in the Boraginaceae family and is found in chaparral, coastal prairie and mesic coastal scrub. It blooms March through June at elevations of 15 to 160 meters. The plant is on the CNPS List 1B.2 and has been documented in the coastal areas just south of Half Moon Bay. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites and in coastal scrub habitat in the Alternative 1 site.

**Hickman's cinquefoil (*Potentilla hickmanii*).** This perennial herb is in the Rosaceae family and is found in coastal bluff scrub, closed-cone coniferous forest, mesic meadows and seeps, and freshwater marshes and swamps. It blooms April through August at elevations of 10 to 149 meters. This plant is on the CNPS List 1B.1, and is federally and state listed as endangered. It has been documented to occur on ocean bluffs over Moss Beach, near Pillar Point AFS, but that population is believed to be extirpated. Extant populations exist near Montara, north of the project area. This species was not observed in coastal sage scrub habitat at the Alternative 1 site during site visits for the proposed project and because Princeton Marsh is brackish, it is not likely to occur in Princeton Marsh. Therefore, this species is unlikely to occur at the Alternative 1 site.

**San Francisco campion (*Silene verecunda* ssp. *verecunda*).** This perennial herb is in the Caryophyllaceae family and grows in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland at elevations of 30 to 645 meters. It usually blooms between March and June, but sometimes can be found blooming as late as August. The plant is on the CNPS List 1B.2 and has been documented to occur in San Mateo County, near the top of Montara Mountain. This species was not observed in coastal sage scrub habitat during site visits for the proposed project. However, the species could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites.

**San Francisco owl's clover (*Triphysaria floribunda*).** This annual herb is in the family Scrophulariaceae, and it grows in coastal prairie, coastal scrub, and valley and foothill grassland at elevations of 10 to 160 meters. It blooms between April and June. The plant is on the CNPS List 1B.2. The San Francisco owl's clover is known to occur in San Mateo County, and is documented near San Andreas Lake. Because site visits for the proposed project were conducted outside of the blooming period for this species, it could occur in coastal terrace prairie habitat in the Proposed Action and Alternative 1 sites and in coastal scrub habitat in the Alternative 1 site.

#### 3.7.4.2 Special-Status Wildlife Species that Occur in Habitat Present Within the Proposed Action or Alternative 1 Sites

**Mission blue butterfly (*Plebejus icarioides missionensis*).** Adults form small colonies in wood clearings, grasslands, and sage scrub. The life span of adults is about 8 days in May or June, and requires only three species of lupine (*Lupinus albifrons*, *L. variicolor*, or *L. formosus*) as host plants for the larval stage. The mission blue butterfly is federally endangered and only occurs in six locations in the San Francisco Bay Area, two of which are in San Mateo County: in the San Bruno Mountain area and at Skyline Ridge. Although an unidentified lupine species was observed in the Alternative 1 site, the species is not likely to occur at Pillar Point AFS due to the distance of the known locations of the species.

**Monarch butterfly (*Danaus plexippus*).** The monarch butterfly is a CDFG tracked species that roosts in wind-protected tree groves—usually eucalyptus (*Eucalyptus* spp.), Monterey pine (*Pinus radiata*), or Monterey cypress (*Cupressus macrocarpa*)—from northern Mendocino County to Baja California, Mexico. Although there are no known monarch roosting sites at Pillar Point AFS, there are roost sites in Half Moon Bay and this species could utilize the *C. macrocarpa* trees at the Proposed Action site and Alternative 1 site.

**San Bruno elfin butterfly (*Callophrys mossii bayensis*).** This federally endangered species is found in coastal, mountainous areas with grassy ground cover, mainly in the vicinity of San Bruno Mountain. Colonies are located on steep, north-facing slopes within the fog belt. The species requires Pacific stonecrop (*Sedum spathulifolium*) as a larval host plant. Due to the lack of the host plant for this species at the Proposed Action and Alternative 1 sites, this species is not expected to occur in these areas.

**Steelhead – central California coast Evolutionarily Significant Unit (ESU) (*Oncorhynchus mykiss irideus*).** Steelhead trout, a federally threatened species, have an anadromous life history similar to salmon. This species may be expected in the Pacific Ocean or in fresh water streams with appropriate spawning and rearing habitat. This species may occur offshore of the storm water outfall under the Proposed Action.

**California red-legged frog (*Rana aurora draytonii*).** This federally listed threatened species and CDFG Species of Special Concern is found in lowlands and foothills in or near permanent sources of deep water. The California red-legged frog requires 11 to 20 weeks of permanent water for larval development, and prefers areas with shrubby or emergent riparian vegetation. This species has been observed in Princeton Marsh, in pools below culverts east of West Point Avenue, and may be expected in the area of potential effect of the Alternative 1 site.

**San Francisco garter snake (*Thamnophis sirtalis tetrataenia*).** This federally and state listed endangered snake favors densely vegetated ponds close to hillsides where it can sun itself, feed, and find cover in rodent burrows. Its diet consists of red-legged frogs, treefrogs, western toads, and fish. This species may be expected near Princeton Marsh in the area of potential effect of Alternative 1.

**Burrowing owl (*Athene cunicularia*).** Burrowing owls are year-round residents of open, dry grassland, desert habitats, and open scrub communities. Burrowing owls nest between March and late June. Nests are characteristically constructed within abandoned burrows of colonial mammals such as ground squirrels. This species has been reported in San Mateo County. Although coastal terrace prairie habitat at Pillar Point AFS provides habitat for this species, no signs of this species were observed during site visits performed for the proposed project. Therefore, it is unlikely that this species occurs in the Proposed Action and Alternative 1 sites.

**Alameda song sparrow (*Melospiza melodia pusillula*).** This CDFG Species of Special Concern is found in salt marshes dominated by pickleweed (*Salicornia* spp.) and nests in gumplant (*Grindelia* spp.) bushes as well as *Salicornia*. This species has the potential to occur on the margins of Princeton Marsh, in the area of potential effect for Alternative 1. However, as the species is typically restricted to tidal salt marshes on the fringes of the San Francisco Bay, any Alameda song sparrow to be found at Pillar Point AFS would likely be transient rather than resident.

**California brown pelican (*Pelecanus occidentalis californicus*).** The California brown pelican is listed as federally endangered, however, on February 20, 2008 the USFWS proposed to delist the species due to its recovery. California brown pelican roosts on the rocky cliffs and coastal bluffs of offshore islands in the area of Pillar Point AFS. Offshore kelp beds provide excellent feeding areas. Pelican numbers peak from June through January as they migrate north from Mexico. They have been sighted and are common at numerous locations along the coast, including Monterey Bay, Half Moon Bay, and Pillar Point Harbor. This species could potentially roost on the cliffs at Pillar Point AFS adjacent to the Proposed Action and Alternative 1 sites and feed offshore of the storm water outfall under the Proposed Action.

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**California clapper rail (*Rallus longirostris obsoletus*).** This federally and state endangered bird is a year-round resident of coastal wetlands and brackish areas around San Francisco, Monterey and Morro bays. The species requires emergent wetlands or tidal sloughs dominated by pickleweed (*Salicornia* spp.), cordgrass (*Spartina* spp.), and/or bulrush (*Scirpus* spp.). Although this species has not been observed near Pillar Point AFS, it may occur in Princeton Marsh.

**Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*).** This CDFG Species of Special Concern breeds and nests in salt marsh areas. Therefore, the saltmarsh common yellowthroat may occur in areas of Princeton Marsh, within the area of potential effect of Alternative 1.

**American badger (*Taxidea taxus*).** This CDFG Species of Special Concern is most often found in drier, open stages of shrub, forest, and herbaceous habitats with friable soils. American badgers dig burrows in open, uncultivated ground and prey on burrowing rodents. Although coastal terrace prairie habitat at Pillar Point AFS provides habitat for this species, no signs of this species were observed during site visits performed for the proposed project. Therefore, it is unlikely that this species occurs in the Proposed Action and Alternative 1 sites.

**Pallid bat (*Antrozous pallidus*).** This CDFG Species of Special Concern occupies a wide variety of low-elevation habitats, including grasslands, shrublands, woodlands, and forests. The pallid bat is most common in dry, open habitats and prefers rocky outcrops, cliffs, and crevices for roosting. Maternity colonies of 10-100 individuals form in early April. This species has not been observed at Pillar Point AFS, but the species could roost on the cliffs or Monterey cypress trees (*Cupressus macrocarpa*) near the Proposed Action and Alternative 1 sites.

**Pacific harbor seal (*Phoca vitulina*).** Pacific harbor seals are the most common pinniped species seen and documented in the Pillar Point area. The James V. Fitzgerald Marine Reserve contains four to five harbor seal haul-out sites (sites vary year to year). The Reserve is not known to be an established rookery site but known rookery sites are nearby and breeding could potentially occur in the James V. Fitzgerald Marine Reserve. Surveys have documented 1 to 200 harbor seals in this area. At Maverick's Beach, located one-half mile north of the point, another haul-out site exists, where there are typically 20 to 40 seals hauled-out. Rehabilitated harbor seals taken in by the Marine Mammal Center of Sausalito, California, are released at various sites within the Fitzgerald Marine Reserve, to the north of Pillar Point. Harbor seals are also known to haul-out at Sail Rocks, at the base of the cliffs of Pillar Point, located 0.5 mile from the proposed project area. Inside Pillar Point Harbor, harbor seals haul-out on man-made floating rafts located directly in front of the Half Moon Bay Yacht Club about 0.5 mile from Pillar Point AFS. Depending on the amount of activity in the area, there are typically five to eight seals on these rafts. Harbor seals are frequently seen swimming in the harbor year round (Breen 2007). Due to the proximity of haul-outs for this species, harbor seals could occur offshore of the storm water outfall under the Proposed Action.

**Steller sea lion (*Eumetopias jubatus*).** The federally threatened Steller sea lion hauls out on coastal islands and occasionally on offshore rocks on the mainland. The largest breeding colony for the species is located at Año Nuevo Island near Santa Cruz (CDFG 2009). Although no known haul outs or breeding colonies occur in the James V. Fitzgerald Marine Reserve, due to the proximity of Año Nuevo Island, the species could occur offshore of the storm water outfall under the Proposed Action.

**Northern elephant seal (*Mirounga angustirostris*).** The northern elephant seal hauls out on coastal islands, on offshore rocks, and on the mainland. One of the largest breeding colonies for the species is located at Año Nuevo Island and on the mainland at Año Nuevo near Santa Cruz (CDFG 2009). Although no known haul-outs or breeding colonies occur in the James V. Fitzgerald Marine Reserve, due

to the proximity of Año Nuevo Island, the species could occur offshore of the storm water outfall under the Proposed Action.

**Southern sea otter (*Enhydra lutis nereis*).** The federally Endangered southern sea otter is found in nearshore marine environments of California from Año Nuevo, San Mateo County to the Channel Islands. Canopies of giant kelp and bull kelp provide important rafting and feeding areas for this species. Therefore, this species could occur offshore of the storm water outfall under the Proposed Action.

**California sea lion (*Zalophus californianus*).** The California sea lion is the most abundant pinniped in California waters. They haul out on offshore rocks, sloping rock outcroppings, sandy and cobblestone beaches, jetties, and buoys. They breed in concentrated rookeries on the Channel Islands and in Mexico. Males migrate northwards after the breeding season, while females and pups generally remain near breeding rookeries. Females rarely give birth north of San Miguel Island in the Channel Islands (CDFG 2009). During the fall after the breeding season, hundreds of male sea lions congregate for a few days just outside of the James V. Fitzgerald Marine Reserve and on Sail Rocks immediately south of Pillar Point before heading north to feed (Friends of Fitzgerald Marine Reserve 2009). This species could occur offshore of the storm water outfall under the Proposed Action.

**Gray whale (*Eschrichtius robustus*).** Of the 13 cetacean species known to migrate offshore of Pillar Point AFS, the gray whale is one of two species that is considered to have the potential to occur within 0.5 mile of shore. Gray whales have been known to approach the coastlines and inshore, especially mothers with their calves during migration periods from March through August and again from November through March (NOAA 2004). Gray whale calves have occasionally come into harbors or have been known to occur near breakwaters. Therefore, on rare occasion, this species could occur offshore of the storm water outfall under the Proposed Action.

**Humpback whale (*Megaptera novaeangliae*).** On rare occasions, the humpback whale may also come inshore, though it is less likely in this area than the gray whale. Because this species occurs in more open ocean environments, this species is not likely to occur offshore of the storm water outfall under the Proposed Action.

### 3.7.5 Wetlands

A wetlands delineation was conducted on November 27 and December 11, 2007 by Ms. Kelly Bayer and Ms. Meredith Zaccherio, biologists with Tetra Tech, Inc., to determine if wetland resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and the Regional Water Quality Control Board were present in the area of potential effect of the Proposed Action or Alternative 1 sites. All potential wetland areas at the Proposed Action and Alternative 1 sites were included in the study area. Princeton Marsh, was excluded from the delineation as the boundaries of the marsh are evident, however, an area of willow scrub where the culvert under West Point Avenue leading to Princeton Marsh would be replaced, was included in the delineation.

The survey was conducted using National Wetlands Inventory maps, soil survey information, and site observations, and was performed in accordance with the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Environmental Laboratory 2006). Three criteria were assessed—the presence of (1) hydrophytic (water-adapted) vegetation; (2) wetland hydrology; and (3) hydric soils. All three indicators must be present for the area to be classified as a wetland under federal jurisdiction. The wetland/upland boundaries were located by observing changes in vegetation and

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topography, and the delineation was verified using data sampling points that represent either side of the boundary (Tetra Tech 2007a).

Only one area of the study area was determined to contain jurisdictional wetlands, the willow scrub habitat area north of Princeton Marsh and West Point Avenue and connected to the marsh by a culvert under the road. One source of water to this area is the existing asphalt channel that drains storm water from West Point Avenue. This area contained predominantly hydrophytic vegetation, soils were mapped and observed as hydric, and it was connected hydraulically to Princeton Marsh by the culvert. Additionally, soils were observed to be saturated near the surface. No other jurisdictional wetlands were found in the study area (Tetra Tech 2007a).

## **3.8 NOISE**

### **3.8.1 Noise Characteristics**

Sound is caused by vibrations that generate waves of minute air pressure fluctuations in the air. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second or Hertz (Hz). Different vibrational frequencies produce different tonal qualities in the resulting sound. In general, sound waves travel away from the noise source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from its source, resulting in a decrease in loudness at greater distances from the noise source.

Human hearing varies in sensitivity to different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hz, is less sensitive to higher and lower sound frequencies, and is least sensitive to sound frequencies below 250 Hz. Several different frequency weighting schemes have been developed to approximate the way the human ear responds to noise levels or to account for the response of building materials to airborne vibrations and sound. The most commonly used decibel weighting schemes are the A-weighted and C-weighted scales.

The "A-weighted" decibel scale (dBA) is normally used to approximate human hearing response to sound. The A-weighted scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure level for some middle frequency sounds. The "C-weighted" decibel scale (dBC) is often used to characterize low frequency sounds capable of inducing vibrations in buildings or other structures. In general, a fluctuation in sound of 1 dBA is noticeable only under laboratory conditions and a change of 3 dBA is just noticeable in field conditions.

Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for annoyance potential due to time of day or other considerations. The Leq data used for these average noise exposure descriptors are generally based on A-weighted sound level measurements, although other weighting systems are used for special conditions (such as blasting noise).

Average noise exposure over a 24-hour period is often presented as a community noise equivalent level (CNEL). CNEL values are calculated from hourly Leq values, with the Leq values for the evening period (7 pm to 10 pm) increased by 5 dB and the Leq values for the nighttime period (10 pm to 7 am) increased by 10 dB to reflect the greater disturbance potential from evening and nighttime noises. Day-night noise level (Ldn) values are computed in a way that is similar to CNEL, except that there is no weighting factor for evening noise levels. As a practical matter, CNEL and Ldn values are often treated as being

interchangeable. Unless specifically noted otherwise, CNEL and Ldn values are assumed to be based on dBA measurements.

### **3.8.2 Regional Noise Setting**

The project area is located in an unincorporated portion of San Mateo County. The Noise Element of the San Mateo County General Plan defines noise sensitive land uses as residential areas, hospitals, schools, and libraries. In addition, the Noise Element defines noise-impacted areas as those areas exposed to CNEL levels above 60 dBA.

### **3.8.3 Site Noise Setting**

Ambient noise conditions in the project area have not been measured, but would typically be dominated by natural noise sources with intermittent periods of noise from vehicle traffic and aircraft overflights. Typical ambient noise levels at the project site are likely to vary from about 35 dBA to about 55 dBA, depending on wind and surf conditions. The lowest noise levels are likely to occur at night during periods of low winds and minimal surf.

The project area is approximately 0.66 mile from the south end of the Half Moon Bay Airport runway and about 0.9 mile from Highway 1. There are no noise-sensitive land uses immediately adjacent to the project site. The unincorporated communities of Moss Beach and El Granada are the closest developed areas. There are commercial recreation and general industrial developments east of the project site along the shoreline of Pillar Point Harbor, and an area of medium density residential development north of the project site on the west side of Airport Street. The closest portion of the commercial recreation and industrial area along the north side of Pillar Point Harbor is approximately 0.32 mile from the loop road on the project site. The closest residential unit is about 0.52 mile north of the loop road.

## **3.9 POLICE, FIRE, AND EMERGENCY SERVICES**

Police, fire, and emergency services to Pillar Point AFS are provided by San Mateo County.

## **3.10 SAFETY AND OCCUPATIONAL HEALTH**

Construction of the Proposed Action could involve health and safety hazards such as slips, trips, and falls, and other hazards associated with the use of heavy construction equipment. Construction of the Proposed Action is subject to the ground safety requirements of Vandenberg AFB as well as Cal OSHA and federal OSHA standards.

Long-term operation of the new drainage facilities would not affect health and safety.

## **3.11 SOCIOECONOMIC FACTORS**

As described in the CEQ regulations implementing NEPA (Title 40, CFR, Parts 1500 through 1508), potential economic impacts are addressed only to the extent that they are interrelated with the natural or physical effects. Socioeconomic factors considered for the proposed project include population, employment statistics, and availability of housing in the northwestern region of San Mateo County, including the cities of El Granada, Montara, and Half Moon Bay.

According to the U.S. Census Bureau, San Mateo County had an estimated population of 712,690 persons in 2008, an increase of 0.8 percent since 2000 (U.S. Census Bureau 2009). In 2007, San Mateo County

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had an estimated 266,797 housing units (U.S. Census Bureau 2009). The current unemployment rate in San Mateo County is 8.4 percent (California Employment Development Department 2009).

#### **3.12 SOLID WASTE**

In 1989, the California Integrated Waste Management Act was enacted as Assembly Bill (AB) 939. AB 939 mandated a reduction in the quantity of solid waste disposed of in landfills, including a goal of 50 percent reduction of generated solid waste from a 1990 baseline, by January 1, 2000. The Air Force mandated similar waste diversion goals in the Air Force Pollution Prevention Program, using a 1992 baseline. The Air Force Pollution Prevention Plan requires installations to try to achieve a 50 percent reduction of generated solid waste, excluding construction and demolition (C&D) debris by December 31, 1997.

Although the proposed project is not subject to County ordinance, San Mateo County has an ordinance related to recycling and diversion of construction and demolition debris (Ordinance No. 04099 adopted on February 26, 2002), that requires that 100 percent of inert solids and 50 percent of the remaining construction and demolition debris be reused or recycled and diverted away from the landfill. The County maintains a list of County-approved salvage, reuse, and recycling facilities for C&D debris.

In accordance with Vandenberg AFB's Solid Waste Management Plan, all construction contracts must include a requirement that non-hazardous solid waste disposal and diversion activities be reported to Vandenberg AFB's Solid Waste Manager. The construction contractor and project, amount and type of solid waste disposed of off-site, and the location of disposal must be reported to the Solid Waste Manager on a monthly basis.

Disposal of C&D debris must meet the regulatory requirements of Title 14, *Natural Resources*, Division 7, *California Integrated Waste Management Board*, Chapter 3, *Minimum Standards for Solid Waste Handling and Disposal* including Article 5.95, *Construction and Demolition Waste and Inert Debris Disposal*. Finally, if removal of noxious plant material such as pampas grass, ice plant, or star thistle is required, then this plant material must be segregated out and disposed of as required by Vandenberg AFB's Noxious Weed Program.

The nearest landfill that could accept solid waste from the proposed project is San Mateo County's Ox Mountain Landfill, a Class III landfill that currently occupies 311 square miles. The Ox Mountain Landfill is allowed to accept a daily maximum of 3,598 tons of waste (California Integrated Waste Management Board 2009).

#### **3.13 TRAFFIC AND TRANSPORTATION**

Access to Pillar Point AFS is provided by Highway 1 to West Point Avenue, a two-lane asphalt road entering the station from the north. Within 150 feet of the main gate, West Point Avenue divides, forming a loop inside the station referred to as Loop Road.

#### **3.14 UTILITIES**

Electrical, communication, water, and sewer lines run throughout Pillar Point AFS. Underground communication lines run from the Security Station near the main gate to the northeast corner of Building 17. Underground telephone and electrical lines run 400 feet along northern Loop Road before turning south toward Building 15 and continuing southeast to Building 212. Septic tanks and associated sewer lines handle sewage produced at the station.

### 3.15 WATER RESOURCES

#### 3.15.1 Regulatory Setting

The Federal Water Pollution Control Act of 1948 was promulgated to “enhance the quality and value of our water resources and to establish a national policy for the prevention, control and abatement of water pollution.” The Act defined “Waters of the United States” as all surface water bodies of the U.S., including all rivers, streams, lakes, wetlands, estuaries and territorial seas. The Act was amended in 1972 and again in 1977, when it became known as the “Clean Water Act” (CWA) (33 U.S.C. 25). The amendments established a system for regulating pollutant discharges into the Waters of the U.S. including (1) a permit structure designed to control and eventually eliminate pollutant discharges, (2) the requirement to develop water quality standards and pollution control programs, and (3) the requirement to implement grant programs to install infrastructure intended to prevent pollutant discharges. The CWA established the baseline goal of attaining fishable, swimmable waters throughout the United States.

In California, the Porter-Cologne Water Quality Control Act of 1962 (Porter-Cologne Act) is the principal law governing water quality in California and establishes State authority over water rights and policy. The Porter-Cologne Act is codified under Title 23 of the CCR and unlike the CWA, applies to both surface water and ground water. The Porter-Cologne Act designates the SWRCB as the statewide water quality planning agency, and also gives authority to nine partially self-directed Regional Water Quality Control Boards.

Pillar Point AFS lies within the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), Region 2. However, discharges to the ocean are regulated under the *Water Quality Control Plan, Ocean Waters of California* (California Ocean Plan or COP, SWRCB 2005) and are the jurisdiction of the SWRCB.

The CWA was amended in 1987 to establish phased National Pollutant Discharge Elimination System (NPDES) requirements for storm water discharges. The Storm Water Phase I Program (1990) established permit requirements and required the preparation of Storm Water Management Plans for operators of medium and large municipal separate storm sewer systems (MS4s) located in incorporated places or counties with populations of 100,000 or more and for various categories of construction activity, including construction activity disturbing five or more acres of land. According to 40 CFR 122.26(b)(8), “*municipal separate storm sewer* means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- (i) Owned by or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law)...including special districts under State law such as a sewer district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States.
- (ii) Designed or used for collecting or conveying storm water;
- (iii) Which is not a combined sewer; and
- (iv) Which is not part of a Publicly Owned Treatment Works as defined in 40 CFR 122.2.”

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A Phase I MS4 was designated “medium” if the population served was between 100,000 and 249,999 or as “large” if the population served was 250,000 or greater. The U.S. EPA published the Phase II Final Rule in the *Federal Register* on December 8, 1999, which extended NPDES permitting requirements to include construction activity disturbing between 1 and 5 acres of land. Discharges of storm water to Waters of the U.S. from construction projects that result in soil disturbance of at least one acre are regulated under *General Permit for Waste Discharge Requirements for Discharges of Storm Water Associated with Construction Activity (NPDES General Permit CAS000002) Water Quality Order 98-08-DWQ* (General Permit). Additionally, projects under one acre but that are part of a larger common plan of development that encompasses one or more acres of soil disturbance are also regulated under the General Permit. The General Permit requires the development of a Storm Water Pollution Prevention Plan that describes best management practices (BMPs) to prevent pollutant and sediment discharges from the construction site and an inspection and monitoring program.

The Phase II Final Rule also extended NPDES permitting requirements to include all small MS4s located within an “urbanized area.” Examples of traditional MS4s are cities and counties; non-traditional MS4s are departments of transportation systems, airports, universities, and federal installations or facilities. Vandenberg AFB is considered a “non-traditional” small MS4 and is therefore, subject to the requirements of the Phase II Final Rule. In accordance with the 2003 *NPDES General Permit No. CAS000004, WDR for Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems* (MS4), a Storm Water Management Plan (U.S. Air Force 2005) was developed for Vandenberg AFB, which is currently being revised to meet the Central Coast Regional Water Quality Control Board’s (CCRWQCB) requirements to obtain permit coverage.

#### **3.15.2 Local Regulatory Setting**

Storm water runoff from Pillar Point AFS flows in a westerly direction to the Pacific Ocean. This area is known as the James V. Fitzgerald Marine Reserve and is one of 34 ASBS’ identified within the COP. As stated in Section 2.0, the Air Force was notified by the SWRCB on 21 October 2004, alleging a violation of the COP, arising from discharge of storm water from Pillar Point AFS into the James V. Fitzgerald Marine Reserve. The SWRCB notification required the Air Force to cease the discharge or file a temporary request of exception to the prohibition. The 30th Space Wing’s Environmental Quality Office (30 CES/CEANQ) submitted an application to the SWRCB for an exception to the COP prohibition, in order to comply with the SWRCB’s timeline. While awaiting guidance from the SWRCB regarding the exception application, the 30 CES/CEANQ funded a storm water outfall engineering feasibility study in August 2006 to determine the most appropriate and feasible method for ceasing the discharge of storm water runoff into the ASBS.

Although Pillar Point AFS would normally be subject to provisions and best management practices set forth in the Vandenberg AFB Storm Water Management Plan, the discharge of storm water to an ASBS is regulated by the COP and alleged violations must be addressed; therefore, Pillar Point AFS is not incorporated into the Vandenberg AFB Storm Water Management Plan. However, once the storm water discharge at the outfall has ceased, and COP conformance attained, storm water generated at Pillar Point AFS will be subject to the Vandenberg AFB Storm Water Management Plan.

#### **3.15.3 Surface Water**

Denniston Creek flows through the coastal plain east of Pillar Point AFS and discharges approximately 0.5 mile northeast of Pillar Point AFS into Princeton Marsh and then into Pillar Point Harbor. The Denniston Creek Reservoir is approximately 1.5 miles northeast and upgradient of Pillar Point AFS. Pillarcitos Lake and Dam are located approximately 4.75 miles northeast of the station. The Pacific

Ocean abuts the site to the north, west, and south, and the base of the wave-cut cliff is subject to erosion by wave action.

Pillar Point AFS receives moderate annual rainfall averaging 23.43 inches per year, with the greatest amount of precipitation occurring between the months of December and March (SAIC 1994a). Heavy rains during the winter of 1997-1998 contributed to numerous landslides and cliff retreat along the California coastline, including Pillar Point AFS.

The majority of the storm water runoff at Pillar Point AFS flows directly to the ocean over the cliffs as small rivulets or sheet flow. However, the approximately 8.3 acres of land inside the West Point Avenue loop road drains to a single concrete outfall at the northern end of the drainage area. Figure 2-2 shows the site layout and drainage area of concern within the loop road (Area I in Figure 2-2). Runoff, from precipitation falling on impervious surfaces such as building roofs, parking lots, and roads is collected via surface drainage and building gutter systems and conveyed through above- and below-ground piping to concrete roadside ditches.

### **Storm Water Quality**

Storm water quality monitoring has been performed at Pillar Point AFS since February 2006 (Tetra Tech 2007b, 2008, 2009a). Storm water samples were collected at (1) the on-site discharge point, (2) the ocean outfall, and (3) an ocean reference point (up-coast) for constituents consistent with the COP exception application requirements. The results of prior sampling indicates that runoff from the Pillar Point AFS has similar characteristics to typical urban pollutant profiles with elevated concentrations of heavy metals (copper, lead, zinc, chromium, cadmium, mercury, nickel, and beryllium), ammonia, turbidity, and indicator bacteria (i.e. total and fecal coliform and *Enterococcus*). Storm water samples were analyzed for the presence of human *Bacteroidetes* and *Enterococcus* DNA biomarkers in 2009; results were negative, indicating little possibility of human fecal contamination of storm water runoff (Tetra Tech 2009a).

In addition, a Septic Inspection Report was conducted for a septic tank located near Building 10, which determined that the septic tank and drain field is operating under acceptable conditions (Septic Tank Service 2008). Finally, a project to replace an aging septic tank near Building 17 is in the process of being awarded and implemented.

The results of all referenced storm water quality and septic inspection reports is available upon request to the 30th Space Wing's Environmental Quality Office (805-606-7541).

### **3.15.4 Groundwater**

Pillar Point is an uplifted block of land located west of the north/south trending San Gregorio fault. This fault forms a hydrogeologic barrier that isolates Pillar Point AFS from inland groundwater basins found east of the site (Fugro 1999). During past geotechnical investigations at Pillar Point AFS, groundwater was encountered in the bedrock at depths ranging from 42 feet to 114 feet (Fugro 1999 in Earth Systems 2009). Some perched groundwater may be expected in areas where permeable sands overlay finer grained, weathered mudstones (Earth Systems 2009).

The nearest private and municipal wells are located in the community of Princeton-by-the-Sea and at the Half Moon Bay Airport. The wells draw groundwater from the Denniston Creek/Pillar Point Groundwater Basin.

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#### **3.15.5 Floodplains**

Pillar Point AFS, at an elevation ranging from approximately 80 to 180 feet above mean sea level, is not within a 100-year floodplain. Low-lying areas northeast of the site, such as Princeton Marsh, are within a 100-year floodplain. The failure of the Pillarcitos Lake Dam, located approximately 4.75 miles northeast of Pillar Point AFS, would not affect the AFS.

## 4.0 ENVIRONMENTAL CONSEQUENCES

This section presents the results of the analysis of potential environmental effects associated with the Proposed Action and alternatives. Changes to the natural and human environments that may result from the Proposed Action and alternatives were evaluated relative to the existing environmental conditions described in Chapter 3.

### 4.1 AIR QUALITY

The release of various criteria pollutants would be expected from the construction activities of the Proposed Action, contributing to the overall region emissions. The Proposed Action would have no operational emissions. The Proposed Action would have a significant impact on regional air quality if the amount of construction-related (short-term) emissions exceeded air quality thresholds within the San Francisco Bay Area Air Basin. In addition, the Proposed Action would have a significant air quality impact if emissions exceeded federal *de minimis* thresholds or were considered regionally significant.

#### 4.1.1 Proposed Action

##### 4.1.1.1 Significance Thresholds

##### Criteria Pollutants

The BAAQMD's current threshold of significance for construction activities is qualitative in nature (i.e., emission quantification is not required) and the threshold only applies to fugitive PM<sub>10</sub> dust emissions. Specifically, the BAAQMD currently requires all projects regardless of size to implement a minimum number of BMPs for construction-related fugitive PM<sub>10</sub> dust emissions. Additional BMPs are also required based upon the size of the project, to ensure that impacts remain less than significant.

The BAAQMD is also currently evaluating the use of the Clean Air Act's and California Clean Air Act's New Source Review (NSR) and Best Available Control Technology (BACT) emission limitations as an approach to evaluating construction-related criteria emissions. The BAAQMD is considering this approach because the source of emissions is irrelevant to their effect on cumulative air quality impacts. For this reason, the NSR and BACT daily thresholds were used to determine the significance of construction emissions from the Proposed Action as well. These maximum daily thresholds (in pounds per day [lbs/day]) are provided in Table 4-1.

**Table 4-1**  
**Thresholds of Significance for**  
**Construction-Related Criteria Air Pollutants and Precursors**

<b>Emissions Type</b>	<b>Maximum Daily Emissions (lbs/day)</b>
ROG	54
NO <sub>x</sub>	54
CO	547
SO <sub>2</sub>	219
PM <sub>10</sub>	82
PM <sub>2.5</sub>	54

**Table 4-1 (cont.)**  
**Thresholds of Significance for**  
**Construction-Related Criteria Air Pollutants and Precursors**

**Source:** BAAQMD 1999; BAAQMD 2009

**Notes:**

CO= carbon monoxide

NOx = nitrogen oxides

PM<sub>2.5</sub>= fine particulate matter with a diameter of 2.5 micrometers or less

PM<sub>10</sub> =respirable particulate matter with a diameter of 10 micrometers or less

ROG = reactive organic gases (=ROCs)

SO<sub>2</sub> = sulfur dioxide

### Greenhouse Gases

The BAAQMD's current inventory reveals that greenhouse gas (GHG) emissions from construction activities represent a relatively small portion (less than 2 percent) of the overall GHG emissions inventory in the region. Therefore, current proposed BAAQMD CEQA thresholds do not contain thresholds for GHG emissions under construction (BAAQMD 2009). However, at one time, the BAAQMD had considered two potential significance thresholds for construction GHG emissions: (1) 35,250 million tons (MT) of carbon dioxide equivalents (CO<sub>2</sub>e) over the duration of the construction period, or (2) 10 MT of CO<sub>2</sub>e per day. Although these thresholds are currently not proposed by BAAQMD, these significance thresholds were applied in this impact analysis to determine the significance of GHG emissions from construction of the Proposed Action.

### Conformity Determination

As required by the 1990 Federal Clean Air Act Amendments, U.S. EPA enacted two separate federal conformity rules. Those rules (incorporated as Section 40 CFR Parts 51 and 93) are designed to ensure that federal actions do not cause or contribute to air quality violations in areas that do not meet the national ambient air quality standards. The two rules include transportation conformity, which applies to transportation plans, programs, and projects, and general conformity, which applies to all other non-transportation-related projects. The Proposed Action would be subject to the general conformity rule because the U.S. Air Force is the project proponent.

General conformity regulations are contained in Section 40 CFR Part 51, Subpart W, and Part 93, Subpart B, which were recently updated on March 24, 2010. The general conformity regulation requires that federal agencies sponsoring the non-transportation-related activities show that the emissions associated with those activities conform to SIPs in areas designated in nonattainment or maintenance for one or more of the federal ambient air quality standards. Specifically, compliance is presumed if the net increase in direct and indirect emissions from a Federal action would be less than the relevant *de minimis* levels. If net emissions increases exceed the relevant *de minimis* value, a formal Conformity Determination process is required.

Under the old general conformity regulations (prior to March 24, 2010), federal agencies must also show that emissions from the Federal action are not considered regionally significant, or are less than 10 percent of the emissions inventory for the region. Therefore, although no longer required under the general conformity regulations, a comparison of net emissions with 10 percent of the regional emissions inventory is provided.

Currently, the SFBAAB, which includes San Mateo County, is classified as a moderate federal nonattainment area for ozone. Ozone is formed indirectly when the ozone precursors nitrogen oxides

(NO<sub>x</sub>) and reactive organic gases (ROG) form in the atmosphere in the presence of sunlight. Because ozone is not a directly emitted pollutant, U.S. EPA has set *de minimis* levels for ozone precursors rather than for ozone in its general conformity regulations. The *de minimis* thresholds for these ozone precursors are: (1) less than 50 tons per year for ROG and (2) less than 100 tons per year for NO<sub>x</sub>. In addition, the *de minimis* threshold for PM<sub>2.5</sub> is 100 tons per year. Finally, because the SFBAAB is a maintenance area for carbon monoxide (CO), the project emissions must be below the *de minimis* threshold for CO of 100 tons per year.

The inventories for ROG and NO<sub>x</sub> from the Bay Area 2005 Ozone Strategy (BAAQMD 2006), and PM<sub>2.5</sub> from the Draft Bay Area 2010 Clean Air Plan (BAAQMD 2010), were compared with the total emissions generated from construction activities associated with the Proposed Action to determine whether the Proposed Action would be “regionally significant.” The emissions inventories are summarized in Table 4-3 below.

#### 4.1.1.2 Impact Analysis

##### Criteria Pollutants

Construction emissions estimated for the worst case day of the construction period for the Proposed Action are shown on Table 4-2. Because the determination of the worst case day is made pollutant by pollutant, the worst case day may not be the same for all pollutants. Because some phases overlap and some do not, not all phases will be active on any given day. These emissions were estimated with URBEMIS 2007 using conservative assumptions. The assumptions used to calculate the emissions are provided in Attachment A-1 of the air quality analysis prepared for the proposed project (Tetra Tech 2010a).

Without implementation of the BAAQMD’s required BMPs for control of fugitive dust emissions, PM<sub>10</sub> emissions would exceed the BAAQMD’s threshold (Table 4-2). However, as shown on Table 4-2, with implementation of BMP AIR-1 shown in Section 4.1.4, mitigated construction emissions would not exceed the BAAQMD’s daily thresholds. Therefore with implementation of measure AIR-1 contained in Section 4.1.4, construction emissions would not result in a significant short-term regional air quality impact. In addition, implementation of measure AIR-2 also shown in Section 4.1.4 would further reduce NO<sub>x</sub> and PM<sub>2.5</sub> emissions.

**Table 4-2**  
**Comparison of Proposed Action Emissions with BAAQMD Thresholds for Criteria Pollutants**

Emissions Type	BAAQMD’s Maximum Daily Emissions <sup>1</sup> (lbs/day)	Proposed Action’s Maximum Daily Emissions – Unmitigated (lbs/day)	Proposed Action’s Maximum Daily Emissions – Mitigated (lbs/day)	Significant impact?
ROG	54	8.78	8.78	No
NO <sub>x</sub>	54	50.57	50.57	No
CO	547	27.52	27.52	No
SO <sub>2</sub>	219	0.01	0.01	No
PM <sub>10</sub>	82	<b>102.55</b>	57.32	No
PM <sub>2.5</sub>	54	23.21	13.77	No

Sources:

<sup>1</sup>BAAQMD 2009a.

## 4.0 Environmental Consequences

### Greenhouse Gases

The total emissions from the Proposed Project are 1,941 MT of CO<sub>2</sub>e per year with a maximum of 5.56 MT of CO<sub>2</sub>e per day which are below the conceptual significance thresholds of 35,250 MT of CO<sub>2</sub>e over the duration of the construction period or 10 MT of CO<sub>2</sub>e per day, respectively.

### Conformity Applicability Summary

As shown in Table 4-3 below, emissions from the Proposed Action are substantially lower than the *de minimis* conformity thresholds for ROG, NO<sub>x</sub>, PM<sub>2.5</sub>, and CO. Therefore, a formal Conformity Determination would not be required for the Proposed Action. In addition, emissions from the Proposed Action are much less than 10 percent of the regional inventories for the SFBAAB.

**Table 4-3**  
**General Conformity Analysis**

Source Category	ROG	NO <sub>x</sub>	PM <sub>2.5</sub>	CO
BAAQMD 2010 Emission Inventory (tpy) <sup>1,2</sup>	123,735	154,760	32,448.5	Not available
Federal Attainment Standard	-	Attainment for NO <sub>2</sub>	Non-Attainment	Attainment (maintenance)
Proposed Action Emissions (tpy)	0.11	0.87	0.31 (unmitigated)/ 0.17 (mitigated)	27.52
Conformity Threshold (tpy)	50	100	100	100
Exceeds Conformity <i>de minimis</i> Threshold?	No	No	No	No
Percent of BAAQMD Emission Inventory (%)	<1	<1	<1	-
Exceeds 10% of the Regional Inventory?	No	No	No	-

**Notes:**

1 Emissions inventory for ROG and NO<sub>x</sub> from Bay Area 2005 Ozone Strategy (BAAQMD 2006), Table 1, inventory projection for 2010 (BAAQMD 2006).

2 Emissions inventory for PM<sub>2.5</sub> from Draft Bay Area 2010 CAP (BAAQMD 2010), Table 2.5, inventory projection for 2012. tpy tons per year

#### 4.1.2 Alternative 1

Alternative 1 would have similar air quality impacts as the Proposed Action. Therefore, impacts would be less than significant.

#### 4.1.3 No-Action Alternative

Under the No-Action Alternative there would be no air quality impacts.

#### **4.1.4 Best Management Practices**

**AIR-1.** The following measures will be implemented to control fugitive dust emissions:

- Water trucks or sprinkler systems will be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this will include wetting down areas in the late morning and after work is completed for the day. Watering frequency will be increased when wind speeds exceed 15 mph. Whenever possible, reclaimed water will be used. The use of excessive amounts of water will be avoided, which could cause runoff or erosion.
- The amount of disturbed area at any given time will be minimized.
- On-site vehicle speeds will be reduced to a maximum of 15 mph.
- Gravel pads will be installed at all access points to prevent tracking of mud onto public roads.
- If fill material is to be imported, exported, or stockpiled for more than 2 days, it will be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill to and from the site will be kept tarped from the point of origin.
- After clearing, grading, earth moving, or excavation is completed, the disturbed area will be treated by watering, revegetating, or spreading soil binders until the area is re-planted.
- Vandenberg AFB shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off-site.

**AIR-2.** The following additional measures will be implemented to reduce NO<sub>x</sub> and PM<sub>2.5</sub> emissions from construction equipment:

- Whenever feasible, heavy-duty diesel-powered construction equipment manufactured after 1996 will be utilized.
- Construction equipment having the minimum practical engine size will be utilized.
- The number of pieces of construction equipment operating simultaneously will be minimized.
- Construction equipment will be maintained in accordance with manufacturer's specifications.
- Construction equipment equipped with two to four degree engine timing retard or pre-combustion chamber engines will be utilized.
- Catalytic converters on gasoline-powered equipment will be installed, if feasible.
- If available, diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters will be installed as certified and/or verified by U.S. EPA or California.

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- Diesel-powered equipment will be replaced with electric equipment whenever feasible.
- Idling of heavy-duty diesel trucks during loading or unloading will be limited to 5 minutes; and auxiliary power units will be used whenever feasible.
- Worker trips will be utilized by requiring carpooling.

### **4.2 CULTURAL RESOURCES**

Cultural resources would be adversely affected if the proposed project caused loss of the value or characteristics that qualify them for listing on the NRHP, or if the proposed project substantially altered the natural environment or access to it in such a way that traditional cultural or religious activities were restricted. Criteria used to evaluate the significance of cultural resources and to assess potential adverse project effects are set forth in the NHPA.

#### **4.2.1 Proposed Action**

Because no archaeological sites occur in or near the Proposed Action site, no impacts on archaeological resources are anticipated. However, there is always the potential for unexpected discovery of archaeological resources during ground disturbing activities. However, implementation of measure CULT-1 shown in Section 4.2.4 would ensure that construction is halted and Vandenberg AFB's Cultural Resources Group (30 CES/CEANC) contacted immediately in the event that unexpected archaeological resources are discovered. Therefore, impacts on archaeological resources would be less than significant.

Installation of a new diversion pipe would be required adjacent to historic Building No. 40, a part of a historic district (WRLISSHD). However, installation of the pipe would not directly affect the building and because it would be installed underground, would not affect the historic setting of the building. The other historic buildings on Pillar Point AFS (Building Nos. 18 and 22) are not located close to the Proposed Action site and therefore, would not be affected by the Proposed Action.

Vandenberg AFB staff contacted the Amah Mutsun Tribal Band during the week of December 3, 2007 to consult with them on a government-to-government basis regarding the proposed project. Vandenberg AFB received a letter from the Tribal Chair on 14 February 2008 stating the Tribe prefers an alternative that avoids impacts to archaeological sites. With implementation of the Proposed Action, there would be no anticipated impacts on archaeological sites.

#### **4.2.2 Alternative 1**

Alternative 1 has a greater potential for significant impacts on cultural resources. Repairs to existing drainage facilities under Alternative 1 have the potential to directly impact historically significant CA-SMA-151, an archaeological site listed on the NRHP. In addition, because archaeological site CA-SMA-347 is located immediately adjacent to the drainage facilities, there is the potential for direct impacts to this archaeological site under Alternative 1 as well. CA-SMA-347 was recommended as NRHP-ineligible by Applied EarthWorks (2005). However, under this Alternative, data recovery archaeological site CA-SMA-151 would likely be required. In addition, impacts would be significant and potentially unmitigable which would require the preparation of an Environmental Impact Statement.

No historic buildings are located in or near the Alternative 1 site. Therefore, there would be no impacts on historic architectural resources.

#### **4.2.3 No-Action Alternative**

Since no ground disturbing activities would occur under the No-Action Alternative, there would be no impacts on cultural resources.

#### **4.2.4 Best Management Practices**

**CULT-1.** In the event that cultural resources are encountered during project-related ground disturbing activities, all excavation activities will be halted to avoid disturbance of the site or any nearby area reasonably suspected to include cultural resources. The 30 CES/CEANC would be contacted so that an archaeologist can assess the significance of the find.

### **4.3 ENVIRONMENTAL JUSTICE**

A significant impact to environmental justice would occur if:

- There was a significant adverse impact to the natural or physical environment or to health that affected a minority or low-income population or children;
- There was a significant adverse environmental impact on minority or low-income populations or children that appreciably exceeded those on the general population or other comparison group;
- The risk or rate of environmental hazard exposure by a minority of low-income population was significant and exceeded those by the general population or other comparison group; or
- A health or environmental effect occurred in a minority of low-income population affected by cumulative or multiple adverse exposures from environmental hazards.

#### **4.3.1 Proposed Action**

The Proposed Action would not affect minority or low-income populations or children. Therefore, there would be no environmental justice impacts under the Proposed Action.

#### **4.3.2 Alternative 1**

Alternative 1 would not affect minority or low-income populations or children. Therefore, there would be no environmental justice impacts under the Alternative 1.

#### **4.3.3 No-Action Alternative**

Under the No-Action Alternative, storm water runoff would continue to be discharged to the ASBS. However, this discharge would not disproportionately affect minority or low-income populations or children. Therefore, there would be no environmental justice impacts under the No-Action Alternative.

### **4.4 GEOLOGY AND SOILS**

Impacts would be considered potentially significant if the project resulted in substantially increased erosion, landslides, soil creep, mudslides, and unstable slopes. Impacts would also be considered significant if they increased the likelihood of, or resulted in exposure to, earthquake damage, slope failure, foundation instability, land subsidence, or other severe geologic hazards. Geologic impacts may

## **4.0 Environmental Consequences**

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also be considered significant if they result in the loss of the use of soil for agriculture or habitat, loss of aesthetic value from a unique landform, or loss of mineral resources.

### **4.4.1 Proposed Action**

#### **4.4.1.1 Short-term Impacts**

Grading conducted during construction of the Proposed Action has the potential to cause erosion onsite. However, with implementation of the erosion control measures contained in measure WATER-1 in Section 4.15.4 under *Water Resources* below, short-term impacts on geology and soils would be less than significant.

#### **4.4.1.2 Long-term Impacts**

The proposed new bioretention cells are designed to increase infiltration of storm water. The seacliffs surrounding Pillar Point AFS are highly susceptible to landslides and an increase in the infiltration of water on the bluff top could potentially increase the risk of landslides along the adjacent seacliff. Therefore, Earth Systems was hired by Tetra Tech, Inc. to (1) conduct a third-party review of past geotechnical studies at Pillar Point AFS (which consists of only one study performed by Fugro in 1999), and (2) to conduct a slope stability analysis for the Proposed Action (Earth Systems 2009). Earth Systems analyzed two cross sections through the Proposed Action site to analyze the stability of the slopes east of the Proposed Action site.

In a slope stability analysis, the forces resisting a potential landslide are first determined. These are essentially the strength of the rocks or soils making up the bluff. Next, the forces driving a potential landslide are determined. These forces are the weight of the rocks as projected along a potential slide surface. The resisting forces are divided by the driving forces to determine the “factor of safety.” A value below 1.0 is theoretically impossible, as the slope would have failed already. A value of 1.0 indicates that failure is imminent. Factors of safety at increasing values above 1.0 lend increasing confidence in the stability of the slope. The industry-standard for new development is a factor of safety of 1.5, and many local grading ordinances in California and elsewhere require that artificial slopes meet this factor of safety (Johnsson 2003). To ensure stability during an earthquake, or under “pseudostatic conditions,” a factor of safety of 1.1 generally is considered adequate (Johnsson 2003).

The analysis performed in 2009 by Earth Systems indicates that installation of the proposed new bioretention cells would have a small adverse impact on slope stability, but that factors of safety would remain acceptable. Specifically, under static conditions, the minimum factor of safety was found to be 1.59 before installation of the bioretention cells and 1.57 after installation of the bioretention cells, which would be greater than the minimum factor of safety of 1.5 (Earth Systems 2009). Under pseudostatic conditions, the minimum factor of safety was found to be 1.22 before installation of the bioretention cells and 1.21 after installation of the bioretention cells, which would be greater than the minimum factor of safety of 1.1 (Earth Systems 2009).

Because the slope stability analysis performed in 2009 was based on a number of assumptions, additional subsurface exploration and laboratory testing was performed in 2010. The additional exploration and testing was performed by Earth Systems and specifically in the vicinity of the eastern bluff, an area deemed critical for slope stability with respect to construction of roadside bioretention cells that will infiltrate storm water. Earth Systems interpretation and analysis of the data generated during the study concluded that the easternmost sections of the bioretention cells would be situated within the limits of an ancient landslide of marginal stability (2010).

Stability analyses performed by Earth Systems using strength values determined by testing cores samples taken within the slide mass yielded factors of safety that would be unacceptable for new construction because they were below 1.5; however, those for the seismic screening analysis yielded acceptable factors of safety because they were greater than 1.0 (Earth Systems 2010). Earth systems found these analyses to vary significantly where residual strength values were used. Furthermore, all factors of safety for static and seismic screening that were calculated using the residual strengths were unacceptable, and all indicated ongoing instability within the slide mass. Earth Systems noted that these results were inconsistent with current geomorphology and concluded that at present the slope is marginally stable (2010). Earth Systems' report is part of the administrative record for the EA. A copy of this report is available upon request to 30 CES/CEANQ (805-606-7541).

Infiltrating storm water into the subsurface above the slide plane would affect the stability of the slope and is inconsistent with good engineering practice; therefore, an impermeable liner will be incorporated into the design of the roadside bioretention cell. This design feature is consistent with Earth System's reported recommendations (2010). The impermeable liner will be used specifically within the boundaries of the ancient landslide and within 50 feet of the southern and northern limits of the slide, totaling approximately 290 feet. This design feature will allow the growth of plants, but eliminate the downward infiltration of storm water within the limits of the ancient landslide.

The Proposed Action would have no other potential geologic hazard impacts.

#### **4.4.2 Alternative 1**

Impacts of Alternative 1 on geology and soils would be identical to the Proposed Action, except that Alternative 1 would have a slightly greater short-term erosion impact during construction relative to the Proposed Action due to the additional repairs to the drainage infrastructure along West Point Avenue.

#### **4.4.3 No-Action Alternative**

The No-Action Alternative would have no impacts on geology and soils.

### **4.5 HAZARDOUS MATERIALS AND WASTE MANAGEMENT**

An impact involving hazardous materials and hazardous waste would be considered significant if their transport, use, or disposal posed a serious hazard to the public or the environment. Potential issues include the potential for accidents resulting in the release of hazardous materials; emissions of hazardous materials associated with demolition and construction activities, especially within one-quarter mile of a school; activities that pose a serious risk of fire, especially wildland fires; potential obstruction of emergency response or evacuation routes within and around the project area; and violation of any associated federal, California, or San Mateo County regulation or applicable permit condition.

#### **4.5.1 Proposed Action**

The Proposed Action would involve the use of hazardous materials during the demolition of existing storm water drainage systems and the construction of bioretention cells. However the project would not involve the generation of hazardous waste.

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### **4.5.1.1 Hazardous Materials**

Hazardous materials used in conjunction with the Proposed Action would typically involve commonly used construction materials and fuel and lubricants for associated construction equipment. The use or storage of significant quantities or concentrations of extremely hazardous substances would not be anticipated. Hazardous materials would not be used during operation of the revised storm water drainage facilities. Therefore, impacts would be less than significant.

### **4.5.1.2 Hazardous Waste**

Building 17, part of AOC-24 is located outside of the Proposed Action site. Any soil contamination present in the other areas of the AOC has been remediated according to the DTSC (see Section 3.5). Therefore, construction of the Proposed Action would not disturb contaminated soil.

Demolition activities associated with the Proposed Action would not be expected to generate hazardous waste, but would generate approximately 750 CY of concrete and asphalt waste that would be recycled offsite. These demolition wastes are not anticipated to contain ACM. Curbing intended to be removed during demolition may have surface coatings that contain LBP. Measure HAZ-1 presented in Section 4.5.4 would require testing of demolition waste for LBP, and proper disposal if required. Therefore, impacts would be less than significant.

### **4.5.2 Alternative 1**

Alternative 1 would have similar impacts on hazardous materials/hazardous waste as the Proposed Action.

### **4.5.3 No-Action Alternative**

Under the No-Action Alternative, the proposed construction and demolition activities would not take place. Therefore, there would be no impacts on hazardous materials/hazardous waste.

### **4.5.4 Best Management Practices**

**HAZ-1.** Demolition waste will be inspected for surface coatings. If surface coatings are discovered, U.S. EPA's Toxicity Characteristic Leaching Procedure (TCLP) analysis will be performed to determine if the demolition debris containing lead-based paint or glaze is considered a hazardous waste (if total and soluble lead concentrations exceed 1,000 ppm or 5 ppm, respectively). If determined to be a hazardous waste, the demolition debris will be disposed of per applicable federal and California regulations.

## **4.6 LAND USE**

An impact to land use would be considered significant if it resulted in nonconformance with approved land use plans; conversion of prime agricultural land to other uses; a decrease in its productivity; or conflict with environmental plans or goals, Air Force regulations, permit requirements, or existing uses of the project area or other properties.

A visual resource impact would be considered significant if it interfered with the existing views, blocked visibility, or produced light and glare inconsistent with existing area uses.

#### 4.6.1 Proposed Action

The Proposed Action would not affect visual resources, introduce light or glare, or affect beach access.

As described in Section 3.6, Land Use, the Proposed Action is subject to the Coastal Zone Management Act, and therefore, must be consistent with the policies of the California Coastal Act to the maximum extent practicable. Below is a discussion of the relevant policies of the California Coastal Act and how the Proposed Action is consistent with them.

##### Section 30230: Marine Resources; Maintenance

*Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

##### Section 30231: Biological Productivity; Water Quality

*The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

As described below in Section 4.15, Water Resources, the installation of new bioretention cells would result in an 80 percent reduction in the storm water volume discharged to the ASBS based upon precipitation records, rainwater infiltration capabilities evaluated, and the recorded runoff volumes of the last ten years. In addition, although the majority of the associated pollutant load removal would be attributed to the volume reduction, removal of total suspended solids (TSS) (a proxy for other pollutants) is estimated at 85 percent due to the additional solids that would settle out in the bioretention cells. As a result, expected residual pollutant concentrations at the ASBS would be below the COP water quality objectives. Therefore, the Proposed Action would be consistent with the California Coastal Act policies listed above.

##### Section 30253(a) and (b): Minimization of Adverse Impacts

*New development shall do all of the following:*

*(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*

*(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

As discussed under Section 4.4, Geology and Soils, the proposed new bioretention cells are designed to increase infiltration of storm water. The seacliffs surrounding Pillar Point AFS are highly susceptible to

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landslides and an increase in the infiltration of water on the bluff top could potentially increase the risk of landslides along the adjacent seacliff. Therefore, Earth Systems was hired by Tetra Tech, Inc. to (1) conduct a third-party review of past geotechnical studies at Pillar Point AFS (which consists of only one study performed by Fugro in 1999), and (2) to conduct a slope stability analysis for the Proposed Action.

The slope stability analysis performed by Earth Systems indicates that installation of the proposed new bioretention cells would have a small adverse impact on slope stability, but that factors of safety would remain acceptable. Specifically, under static conditions, the minimum factor of safety was found to be 1.59 before installation of the bioretention cells and 1.57 after installation of the bioretention cells, which would be greater than the minimum factor of safety of 1.5 (Earth Systems 2009). Under pseudostatic conditions, the minimum factor of safety was found to be 1.22 before installation of the bioretention cells and 1.21 after installation of the bioretention cells, which would be greater than the minimum factor of safety of 1.1 (Earth Systems 2009).

The California Coastal Commission has adopted the factors of safety of 1.5 and 1.1 for static and pseudostatic conditions as discussed in a paper entitled *Establishing Development Setbacks from Coastal Bluffs* prepared by the California Coastal Commission's staff geologist, Mark Johnsson (2003). Therefore, because the Proposed Action would meet these minimum factors of safety and subsurface exploration and laboratory testing will be performed to confirm these conclusions (as discussed in Section 4.4, Geology and Soils), the Proposed Action would have a less than significant impact on the risk of landslides and would be consistent with the above policy.

##### **4.6.2 Alternative 1**

Similar to the Proposed Action, Alternative 1 would have no visual impacts.

Princeton Marsh is part of the James V. Fitzgerald Marine Reserve managed by San Mateo County's Parks and Recreation Division. Construction of Alternative 1 could disrupt recreational use of Princeton Marsh for bird watching or hiking; however, this disruption would only occur over four months. Due to the minor nature of repairs to the drainage system along West Point Avenue, it would not preclude recreational use of the area. Therefore, Alternative 1 would have less than significant impacts on recreation.

Under Alternative 1, storm water discharges into the ASBS would be eliminated and instead routed to Princeton Marsh. As discussed in more detail in Section 4.15, Water Resources, below, the storm water pollutant load would be reduced by at least 85 percent from the bioretention cells. Storm water which does not infiltrate into the constructed bioretention cells would be conveyed to Princeton Marsh under Alternative 1. It is anticipated Princeton Marsh will further absorb and treat the remainder of the storm water before it reaches Pillar Point Harbor. Therefore, Alternative 1 could result in cleaner storm water discharged to the Pacific Ocean than under the Proposed Action. Alternative 1 would be consistent with the policies contained in Section 30230 and 30231 of the California Coastal Act listed above.

Because Princeton Marsh is considered an Environmentally Sensitive Habitat Area under the California Coastal Act, the following policy contained in Section 30240 of the California Coastal Act applies to Alternative 1:

##### **Section 30240: Environmentally Sensitive Habitat Areas; Adjacent Developments**

*(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*

*(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

Because pollutant loads are anticipated to be below the marine water quality objectives, residual pollutant concentrations would have a less than significant impact on the brackish marsh itself. However, Alternative 1 would result in an increase in the rate and volume of storm water discharged to Princeton Marsh which could subsequently result in a change in the conductivity of Princeton Marsh and/or could change the hydraulics within the marsh. Overall impacts on the balance of freshwater and saltwater in the brackish marsh ecosystem could be adverse or beneficial depending on the nature of the changes to the ecosystem. Therefore, it is unknown whether Alternative 1 would be consistent with the policy contained in Section 30240 of the California Coastal Act and would require more study.

Finally, as described in Section 4.4, Geology and Soils, Alternative 1 would have identical long-term impacts on landslide potential as the Proposed Action. Therefore, Alternative 1 would be consistent with the Coastal Action policy contained in Sections 30253(a) and (b) of the California Coastal Act listed above.

#### **4.6.3 No-Action Alternative**

Under the No-Action Alternative, storm water discharges into the ASBS would continue. Impacts on water quality would be greater than under the Proposed Action and Alternative 1. Therefore, the No-Action Alternative would be potentially inconsistent with the policies contained in Sections 30230 and 30231 of the California Coastal Act.

### **4.7 NATURAL RESOURCES**

Impacts to biological resources would be considered significant if special-status species or their habitats, as designated by federal, state, or local agencies, were affected directly or indirectly by project-related activities. In addition, impacts to biological resources would be considered significant if substantial loss, reduction, degradation, disturbance, or fragmentation occurred in native species habitats or in their populations. These could be short- or long-term impacts; for example, short-term or temporary impacts may occur during project implementation, and long-term impacts may result from loss of vegetation and thereby loss of the capacity of habitats to support wildlife populations.

#### **4.7.1 Proposed Action**

##### **4.7.1.1 Short-Term Impacts**

Construction of the Proposed Action would result in the removal of a total of approximately 0.61 acre of coastal terrace prairie habitat in the proposed location of the bioretention cell next to the Loop Road; 0.18 acre of coastal terrace prairie habitat would be permanently replaced with the bioretention cell and an additional 0.43 acre would be disturbed by construction equipment. Measure BIO-1 below would involve restoration of 0.43 acre of coastal prairie habitat adjacent to the new bioretention cell and restoration of an additional 0.18 acre in the location of the staging area for the proposed project. Therefore, construction-related impacts on this habitat would be less than significant.

No special-status plant species were observed during surveys performed for the project. However, because surveys were not conducted during their blooming period, the following special-status plants on

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the CNPS List 1B have the potential to occur in coastal terrace prairie habitat at the Proposed Action site as described in more detail in Section 3.7, *Natural Resources*:

- Pappose tarplant;
- San Francisco Bay spineflower;
- Fragrant fritillary;
- Point Reyes horkelia;
- Coast yellow leptosiphon;
- Choris' popcorn-flower; and
- San Francisco owl's clover.

Implementation of measure BIO-2 below would require spring pre-construction surveys for special-status plant species in the construction area, and if special-status plants are found, biological monitoring would be required to minimize impacts to the species. In addition, if any special-status plant species would be directly impacted by construction, voucher specimens would be collected and deposited with the nearest herbarium. Therefore, impacts on special-status plant populations would be less than significant.

Individuals of the special-status monarch butterfly could occur in the Monterey cypress trees located near the cantonment area of Pillar Point AFS, however, no monarch roosting sites occur at Pillar Point AFS. Therefore, dust and noise from construction activities would not have a significant impact on monarch populations. In addition, construction activities are far enough away from the cypress trees that significant impacts on individual monarchs are not anticipated.

There is the potential to "take" nesting bird species protected under the Migratory Bird Treaty Act in the location of proposed construction activities for the Proposed Action. Specifically, nesting birds could occur in coastal terrace prairie habitat located in the footprint of the proposed bioretention cell along Loop Road. Therefore, if construction of this bioretention cell is scheduled to occur during the bird nesting period from April 1<sup>st</sup> through August 30<sup>th</sup>, a pre-construction survey for nesting birds will be completed in coastal terrace prairie habitat, as stated in measure BIO-3 below, to avoid direct impacts to nesting bird species. If nesting birds are found during the survey, Vandenberg Air Force Base (30 CES/CEANC) will consult with the U.S. Fish and Wildlife Service to determine measures required to avoid impacts to nesting birds. Therefore, Vandenberg Air Force Base would comply with the Migratory Bird Treaty Act and impacts would be less than significant.

Potential indirect impacts to bird species near the Proposed Action include disturbance from construction noise and dust, potentially resulting in the disruption of foraging or roosting activities or abandonment of nests located near the project area. Most individuals that would roost near the disturbance zones would be able to move to suitable habitat away from the area of impact, as the disruption would be quite localized. However, significant negative impacts may occur if breeding birds abandon their nests. Pelagic cormorants (*Phalacrocorax pelagicus*) and pigeon guillemots (*Cepphus columba*) have been observed in the past nesting on the cliffs adjacent to the Proposed Action site. The double-crested cormorant (*Phalacrocorax auritus*) also has the potential to nest on the cliffs near the project site. Additionally, the grove of Monterey cypress near the project area may host other species of nesting birds. Construction activities for the Proposed Action would take place approximately 200 feet from the cliffs and

approximately 100 feet from the Monterey cypress. Given the distance of construction activities away from the cliffs and cypress, implementation of standard dust control measures and muffling of construction equipment engines would minimize disturbance to any nesting birds in these areas. Therefore, nest abandonment would be unlikely. Therefore, impacts to nesting birds in these areas would be less than significant.

Although the California brown pelican does not breed at Pillar Point AFS, standard dust control measures and muffling of construction equipment would also minimize disturbance to roosting pelicans.

The pallid bat (*Antrozous pallidus*) also has the potential to roost in the cliff area and may be disturbed by construction activities. Impacts of construction activities would be significant if they disrupted breeding individuals or young of bat species. However, given the distance of construction activities from the cliffs and with implementation of standard dust control measures and muffling of construction equipment, impacts on bat species would be minimized. Therefore, implementation of these measures would ensure that impacts are less than significant.

Finally, pinnipeds haul out far enough away from the Proposed Action site that construction activities would have a less than significant impact on these species.

#### **4.7.1.2 Long-Term Impacts**

As stated above under short-term impacts, installation of the bioretention cell along the Loop Road would permanently remove approximately 0.18 acre of coastal terrace prairie habitat. However, measure BIO-1 would ensure that 0.18 acre of this habitat is restored in the location of the proposed staging area where coastal terrace prairie habitat historically occurred (Santa Barbara Natural History Museum 2000). Therefore, long-term impacts to this habitat would be less than significant.

Implementation of the Proposed Action would improve the water quality of storm water discharges to the ASBS by reducing the volume of storm water runoff by 80 percent and pollutant loads by 85 percent. Pollutant concentrations would be reduced to below COP thresholds established by the SWRCB for the protection of marine life (see Section 4.15, Water Resources). Therefore, residual storm water discharges to the ASBS are expected to have a less than significant impact on marine life, including intertidal communities, fish, and marine mammals, as well as special-status marine species. In addition, BMP WATER-2 would ensure that the new bioretention cells and drainage infrastructure would be maintained on an annual basis.

### **4.7.2 Alternative 1**

#### **4.7.2.1 Short-Term Impacts**

Short-term construction impacts associated with Alternative 1 would be greater than under the Proposed Action, but would likely be less than significant. The same impacts to natural resources under the Proposed Action would occur under Alternative 1. Alternative 1 would also result in additional disturbance to coastal sage scrub habitat, coastal terrace prairie habitat, and wetlands along the margin of West Point Avenue where the asphalt channels and culvert would be improved.

Construction activities would result in direct removal of coastal sage scrub and coastal terrace prairie habitat along West Point Avenue and a small area of willow scrub wetland habitat where the culvert to the east end of Princeton Marsh would be replaced. The direct impact to the wetlands would require a Finding of No Practicable Alternative (FONPA) in compliance with EO 11990 requiring a no net loss of

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wetlands, as well as a Section 404 permit from the USACE and a Section 401 Water Quality Certification or Waiver from the Regional Water Quality Control Board for direct impacts to waters of the United States. However, the coastal sage scrub and coastal terrace prairie habitat along West Point Avenue is significantly disturbed, and is dominated by pampas grass (*Cortaderia selloana*), a plant listed as highly invasive by the California Invasive Plant Inventory. The small area of willow scrub that would be disturbed by replacing the culvert could be restored after construction. Therefore, with habitat restoration of coastal sage scrub, coastal terrace prairie, and willow woodland habitat, impacts could be reduced to less than significant levels.

No special-status plant species were observed during surveys performed for the project. However, because surveys were not conducted during their blooming period, the following special-status plants on the CNPS List 1B have the potential to occur in coastal sage scrub or coastal terrace prairie habitat at the Alternative 1 site as described in more detail in Section 3.7, *Natural Resources*:

- Pappose tarplant;
- San Francisco Bay spineflower;
- San Francisco collinsia;
- Fragrant fritillary;
- San Francisco gumplant;
- Coast yellow leptosiphon;
- Rose leptosiphon;
- Choris' popcorn-flower; and
- San Francisco owl's clover.

In addition, coastal marsh milk-vetch, another plant species on CNPS List 1B, has been observed near Princeton Marsh, and although not observed during surveys for the project, could occur in the Alternative 1 site, especially where the culvert will be replaced near Princeton Marsh.

Implementation of measure BIO-2 would require spring pre-construction surveys for special-status plant species in the construction area, and if special-status plants are found, biological monitoring would be required to minimize impacts to the species. In addition, if any special-status plant species would be directly impacted by construction, voucher specimens would be collected and deposited with the nearest herbarium. Therefore, impacts on special-status plant populations would be less than significant under Alternative 1.

During the biological survey of the Alternative 1 site, a species of lupine (*Lupinus* sp.) was observed near West Point Road in the coastal scrub habitat. The mission blue butterfly, a federally endangered invertebrate, requires lupine as a host plant in its larval stage. If this species were present during implementation of Alternative 1, habitat disturbance or removal of its host plant would result in potentially significant adverse impacts on this species and Section 7 consultation with the USFWS would be required for Alternative 1. Impacts to this species under Alternative 1 are currently unknown.

However, implementation of biological monitoring to avoid disturbance of habitat for the species could likely be implemented to reduce impacts to less than significant levels.

The federally threatened California red-legged frog has been observed in Princeton Marsh and the marsh provides potential habitat for the federally endangered San Francisco garter snake. The California red-legged frog is known to occur in upland habitat up to one mile away from aquatic habitat, and therefore, could occur in the Alternative 1 site where improvements are proposed to the asphalt channel along West Point Avenue and the culvert leading to Princeton Marsh. Although it has not been observed in Princeton Marsh and is less mobile than the California red-legged frog, there is the chance that the San Francisco garter snake could also occur in the Alternative 1 site. If these species were present during implementation of Alternative 1, construction activities could result in inadvertent take of these species and Section 7 consultation with the USFWS would be required for Alternative 1. Impacts to these species under Alternative 1 are currently unknown. However, pre-construction surveys, installation of exclusionary fencing around construction areas, and biological monitoring during construction could be implemented to avoid take of these species and reduce impacts to less than significant levels.

Finally, noise from construction activities under Alternative 1 also has the potential to disturb sensitive species in Princeton Marsh. Although never observed there, the marsh provides potential habitat for the federally listed clapper rail, and CDFG species of special concern, the Alameda song sparrow and saltmarsh common yellowthroat. Because construction noise associated with Alternative 1 may affect a federally listed species, Section 7 consultation with the USFWS may be required for Alternative 1.

#### **4.7.2.2 Long-Term Impacts**

Under Alternative 1, storm water discharges into the ASBS would be eliminated and instead routed to Princeton Marsh. As discussed in more detail in Section 4.15, Water Resources, below, the storm water pollutant load would be reduced by at least 85 percent from the bioretention cells. Storm water which does not infiltrate into the constructed bioretention cells would be conveyed to Princeton Marsh under Alternative 1. It is anticipated Princeton Marsh will further absorb and treat the remainder of the storm water before it reaches Pillar Point Harbor. Therefore, Alternative 1 could result in cleaner storm water discharged to the Pacific Ocean than under the Proposed Action. In addition, because pollutant loads are anticipated to be below the marine water quality objectives (as described in more detail in Section 4.15), residual pollutant concentrations would have a less than significant impact on the brackish marsh itself.

Alternative 1 would result in an increase in the rate and volume of storm water discharged to Princeton Marsh which could subsequently result in a change in the conductivity of Princeton Marsh and/or could change the hydraulics within the marsh. Overall impacts on the balance of freshwater and saltwater in the brackish marsh ecosystem could be adverse or beneficial depending on the nature of the changes to the ecosystem. Therefore, while Alternative 1 would have greater benefits to marine life than the Proposed Action, long-term impacts on the balance of freshwater and saltwater in the brackish marsh ecosystem are unknown and would require further study.

#### **4.7.3 No-Action Alternative**

Under the No-Action Alternative, untreated discharges of storm water runoff would continue to be made into the ASBS. The storm water discharge could result in deleterious effects on marine life that occur offshore of the storm water outfall. Therefore, long-term impacts on natural resources would be greater than under the Proposed Action and Alternative 1.

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### **4.7.4 Best Management Practices**

**BIO-1.** Coastal terrace prairie habitat disturbed by the proposed project will be restored on a 1:1 basis onsite as directed by Vandenberg AFB's Botanist. A total of 0.43 acre of coastal terrace prairie habitat will be restored adjacent to the proposed bioretention cell adjacent to the Loop Road and an additional 0.18 acre of coastal terrace prairie habitat will be restored in the staging area for the proposed project, where coastal terrace prairie historically occurred but where non-native grassland currently exists.

The following maintenance and monitoring of the restored areas will be performed:

- a. Plantings in the coastal terrace prairie restoration areas will be monitored and maintained for three years following installation to ensure proper establishment. During this time, the Air Force will maintain a native plant coverage at a minimum of 70 percent; should this criteria not be met, the Air Force will install replacement plantings. Plants will be watered by hand every two to three days for the first two months following installation (unless these waterings can be supplemented by rainfall), and then on an as needed basis for the remaining three years to ensure proper establishment of the plants. Invasive plant species will be removed prior to installation of plantings and then annually during the following three years on an as needed basis in order to maintain invasive plant species cover at trace levels.

During the year of installation (year 0) and three years following installation (years 1, 2, and 3), the Air Force will perform three monitoring events per year during the spring. Field data collected during the monitoring events will include, but not be limited to:

- Number and condition of container plants;
- Evidence of reproduction (flowers, fruits etc);
- Percent cover of native species;
- Number and percent of invasive species;
- Information regarding the need to weed and water the site;
- Notes on precipitation and the water level within the bioretention cells; and
- Photographs from established photo points.

The Air Force will prepare annual monitoring reports to document the results of the monitoring efforts.

**BIO-2.** Before the commencement of construction, a pre-construction survey will be conducted in the construction areas in May for the following plant species on the California Native Plant Society List 1B:

- Pappose tarplant;
- San Francisco Bay spineflower;
- Fragrant fritillary;
- Point Reyes horkelia;
- Coast yellow leptosiphon;
- Choris' popcorn-flower; and
- San Francisco owl's clover.

If these plant species are found, a biological monitor will be present on-site during ground disturbing activities associated with construction to minimize impacts to these species. Voucher specimens will be collected for any of these plant species potentially directly impacted by construction activities and will be deposited at the nearest local herbarium.

**BIO-3.** For construction activities scheduled to occur during the bird nesting period from April 1 through August 30, a pre-construction survey for nesting birds will be conducted in areas of proposed ground disturbance two weeks prior to construction. If nesting birds are discovered in areas of proposed ground disturbance, Vandenberg Air Force Base (30 CES/CEANC) will consult with the U.S. Fish and Wildlife Service to determine the measures needed to avoid impacts to birds protected under the Migratory Bird Treaty Act.

#### **4.8 NOISE**

Noise impacts from a project would be considered significant if they generated noise levels in excess of 65 dBA CNEL that could affect sensitive receptors. At these locations, outdoor noise levels that exceed 65 dBA or indoor noise levels that cannot be reduced below 45 dBA would be considered a significant impact.

In addition, noise from grading and construction activity proposed within 1,600 feet of sensitive receptors, including schools, residential development, commercial lodging facilities, and hospitals or care facilities, would generally result in a potentially significant impact.

##### **4.8.1 Proposed Action**

###### **4.8.1.1 Short-Term Impacts**

Construction of the proposed drainage improvements would generate short-term noise impacts. Construction activity is expected to last for no more than four months, and would be conducted during normal daytime hours on weekdays. Noise generated by the proposed construction activity was evaluated using a spreadsheet-based construction noise model. The noise model evaluates typical daily noise conditions for different stages of construction activity, and accounts for intermittent use of multiple equipment items. Input to the model includes the number and type of equipment items active in the same general work area for each hour of a 24-hour cycle. An equipment database provides default information on noise levels generated by each type of equipment and the percent of time the equipment is typically operating during each active hour. Default data can be modified by the user to reflect project-specific conditions.

The spreadsheet noise model accounts for distance attenuation and atmospheric absorption effects in reducing noise levels at increasing distances from the location of construction activity. The model automatically calculates noise levels at 20 distances from the main activity areas of the construction site (default distances range from 50 feet to 2 miles). By accounting for intermittent equipment operations, the model produces realistic calculation of various noise metrics, including:

- Hourly average noise levels by time of day;
- Maximum hourly noise levels;
- Average daytime, evening, and nighttime noise levels;
- 24-hour average noise levels (24-hour Leq); and
- 24-hour CNEL or Ldn noise levels.

The Proposed Action was evaluated in terms of three general phases of construction activity:

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- Removal of the existing concrete-lined ditch;
- Excavation of the bioretention cells, the interceptor ditch, the drop inlet, and new pipeline trenches; and
- Installation of engineered fill, check dams, pipeline trench backfill, and any necessary repaving.

The major equipment used for the proposed construction would include a small excavator, a medium wheeled loader, a skid-steer loader, a roller-compactor, a water truck, and large dump trucks. Additional equipment with fairly limited use could include flatbed trucks for delivery of culvert and pipeline sections, cement mixer trucks, portable cement mixers, concrete vibrators, asphalt pavers, and street sweepers.

Results of the construction noise analysis are summarized in Table 4-4 according to distance from the construction activity. Noise modeling results presented in Table 4-4 include the typical daily maximum 1-hour average noise level and the overall CNEL increment for each of the three major phases of construction.

**Table 4-4**  
**Summary of Construction Noise Estimates for the Proposed Action (dBA)**

Distance, ft	Concrete Ditch Removal		Excavation		Engineered Fill and Paving	
	Max 1-Hr Leq	CNEL	Max 1-Hr Leq	CNEL	Max 1-Hr Leq	CNEL
50	82.9	75.7	83.9	77.8	81.6	75.3
100	76.8	69.6	77.8	71.7	75.5	69.3
200	70.7	63.4	71.6	65.6	69.4	63.1
300	67.0	59.7	68.0	61.9	65.7	59.5
400	64.3	57.1	65.3	59.2	63.1	56.8
500	62.2	55.0	63.2	57.1	61.0	54.8
600	60.5	53.2	61.5	55.4	59.3	53.1
700	59.0	51.7	60.0	53.9	57.8	51.6
800	57.6	50.4	58.7	52.6	56.5	50.3
900	56.4	49.2	57.5	51.4	55.4	49.1
1,000	55.4	48.2	56.4	50.3	54.3	48.1
1,500	51.0	43.8	52.1	46.0	50.2	43.9
2,000	47.7	40.6	48.9	42.8	47.0	40.7
2,500	45.0	37.8	46.2	40.1	44.5	38.1
3,000	42.6	35.5	43.9	37.7	42.2	35.9

The closest noise-sensitive land uses are residential units approximately 0.5 mile north of the entrance to Pillar Point AFS. Commercial recreation uses approximately 0.3 mile east of Pillar Point AFS are not considered noise-sensitive. As is evident from Table 4-4, maximum hourly noise levels would be approximately 45 dBA at the nearest residences and less than 52 dBA at the nearest commercial recreation uses. Maximum CNEL increments would be approximately 40 dBA at the nearest residences and less than 46 dBA at the nearest commercial recreation uses. Estimated construction noise impacts at the nearest noise-sensitive land uses are well below the 65 dBA CNEL threshold. Consequently, construction of the Proposed Action would not create any significant noise impacts.

#### **4.8.1.2 Long-Term Impacts**

The Proposed Action would not have any long-term noise impacts, since the proposed drainage system would operate by gravity flow without the need for pumps or motors.

#### **4.8.2 Alternative 1**

Short-term noise impacts associated with construction of Alternative 1 would be similar as for the Proposed Action given that repairs to the drainage system would require similar equipment. No long-term noise impacts would result from Alternative 1.

#### **4.8.3 No-Action Alternative**

There would be no noise impacts associated with the No-Action Alternative.

### **4.9 POLICE, FIRE, AND EMERGENCY SERVICES**

Impacts to police, fire, and emergency services would be considered significant if they resulted in unacceptable service ratios, response times, or other performance objectives.

#### **4.9.1 Proposed Action**

The Proposed Action would not affect police, fire, and emergency services. Construction and operation of the new LID infrastructure under the Proposed Action would not change the level of police, fire, and emergency services required at Pillar Point AFS. Therefore, no impacts would occur to these services.

#### **4.9.2 Alternative 1**

Alternative 1 would not affect police, fire, and emergency services. Construction and operation of the new LID infrastructure under the Proposed Action would not change the level of police, fire, and emergency services required at Pillar Point AFS. Therefore, no impacts would occur to these services.

#### **4.9.3 No-Action Alternative**

The No-Action Alternative would not affect police, fire, and emergency services required at Pillar Point AFS. Therefore, no impacts would occur to these services.

### **4.10 SAFETY AND OCCUPATIONAL HEALTH**

An impact would be considered significant if it created a potential public health hazard or involved the improper use, production, or disposal of materials that pose a hazard to people, animals, or plant populations in the affected area.

#### **4.10.1 Proposed Action**

##### **4.10.1.1 Short-Term Impacts**

During construction of the Proposed Action, site workers would comply with OSHA, U.S. Air Force Occupational Safety and Health regulations, and other recognized standards and Air Force regulations or instructions. Public access to the proposed work sites would be restricted through the use of signs and

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fencing. The construction contractor would also provide for the health and safety of workers and all subcontractors who may be exposed to their operations and services. The contractor would submit a health and safety plan to Vandenberg AFB and appoint a formally trained individual to act as a safety officer. This person would be the point of contact for all issues regarding job site safety. As a result, impacts would be less than significant.

### **4.10.1.2 Long-Term Impacts**

Under the Proposed Action, pollutant loads in storm water discharges to the ASBS are anticipated to be reduced below COP water quality objectives. Therefore, the Proposed Action is not anticipated to have a significant impact on the health and safety.

### **4.10.2 Alternative 1**

Alternative 1 would have similar health and safety impacts during construction.

Over the long-term, Alternative 1 would have a greater remedial effect upon pollutant loads in storm water than the Proposed Action. Therefore, Alternative 1 would have a greater benefit to health and safety than the Proposed Action.

### **4.10.3 No-Action Alternative**

Under the No-Action Alternative, the pollutant loads to the ASBS would remain the same. Although the water quality objectives are protective of marine life, exceedance of the COP's water quality objectives could also indicate a potential risk to human health, especially for pollutants that bioaccumulate. Therefore, the No-Action Alternative would have a greater potential health and safety impact than the Proposed Action and Alternative 1.

## **4.11 SOCIOECONOMIC FACTORS**

A project that substantially altered the location and distribution of the region of influence population, caused the population to exceed its historic growth rates, decreased jobs so as to substantially raise the regional unemployment rates or reduce income generation, substantially affected the local housing market and vacancy rates, or resulted in the need for new school services would be considered to have a significant impact.

### **4.11.1 Proposed Action**

Construction of the Proposed Action would require a small number of construction workers that would likely be from the local area. Because only a small number of workers would be needed and only for a span of four months, the Proposed Action would not significantly affect the workforce in the area. Therefore, the Proposed Action would have less than significant socioeconomic impacts.

### **4.11.2 Alternative 1**

Impacts under Alternative 1 would be similar to those described for the Proposed Action.

### **4.11.3 No-Action Alternative**

No socioeconomic impacts would result from the No-Action Alternative.

## **4.12 SOLID WASTE**

Impacts from solid waste generation would be considered significant if they resulted in noncompliance with applicable regulatory guidelines or increased the amounts generated beyond available waste management capacities.

### **4.12.1 Proposed Action**

#### **4.12.1.1 Short-Term Impacts**

Construction of the Proposed Action would result in the generation of 750 CY of concrete and asphalt waste which would be completely recycled offsite. Disposal of iceplant and pampas grass may be necessary as well, and would be disposed of as required by Vandenberg AFB's Noxious Weed Program. Therefore, impacts on solid waste would be less than significant.

#### **4.12.1.2 Long-Term Impacts**

Solid waste would not be generated under operation of the Proposed Action.

### **4.12.2 Alternative 1**

Alternative 1 would generate slightly more asphalt and concrete waste than the Proposed Action. However, this material can and would be recycled. Removal and disposal of iceplant and pampas grass would also be necessary under Alternative 1 but would be disposed of following the requirements of Vandenberg AFB's Noxious Weed Program. Therefore, impacts would be less than significant.

### **4.12.3 No-Action Alternative**

Solid waste would not be generated under the No-Action Alternative.

## **4.13 TRAFFIC AND TRANSPORTATION**

Project impacts on traffic and transportation would be considered significant if they caused an increase in traffic that was substantial in relation to existing traffic load and capacity of the street system; exceeded an established level of service standard; substantially increased hazards due to a design feature; resulted in inadequate emergency access; resulted in inadequate parking capacity; or conflicted with adopted policies, plans, or programs supporting alternative transportation.

### **4.13.1 Proposed Action**

#### **4.13.1.1 Short-Term Impacts**

Construction traffic associated with the Proposed Action would travel to and from the site via Highway 1 from the surrounding communities of the San Francisco Bay area. The project would only require a small number of workers over the four month construction schedule and the export of 2,500 CY of soil. Therefore, due to the small size of the project and short project duration, the Proposed Action would have less than significant short-term impacts on traffic and transportation on area roadways.

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### **4.13.1.2 Long-Term Impacts**

There would no long-term impacts on traffic and transportation under the Proposed Action.

### **4.13.2 Alternative 1**

Alternative 1 would have the same traffic and transportation impacts as the Proposed Action.

### **4.13.3 No-Action Alternative**

The No-Action Alternative would have no short-term or long-term traffic and transportation impacts.

## **4.14 UTILITIES**

Impacts to utility systems from the proposed project would be considered significant if they exceeded the wastewater treatment requirements of the Regional Water Quality Control Board, required or resulted in the construction of new water or wastewater treatment facilities or expansion of existing facilities, or required or resulted in the construction of new storm water drainage facilities or expansion of existing facilities. Impacts would also be considered significant if they resulted in a requirement for utility supplies (such as water, natural gas, or electricity) that could not be met by existing entitlements or resources.

### **4.14.1 Proposed Action**

Under the Proposed Action, storm water drainage facilities would be improved on Pillar Point AFS, however, there is sufficient capacity to construct such improvements onsite and no offsite infrastructure is needed. In addition, the Proposed Action would have no impacts on other utilities, such as potable water, wastewater, gas, electricity etc. Therefore, the Proposed Action would have a less than significant impact on utilities.

### **4.14.2 Alternative 1**

Impacts on utilities under Alternative 1 would be similar to impacts under the Proposed Action.

### **4.14.3 No-Action Alternative**

There would be no impacts on utilities under the No-Action Alternative.

## **4.15 WATER RESOURCES**

Impacts to water resources would be considered significant if a project caused substantial flooding or erosion; adversely affected any significant water body, such as a stream, lake, or bay; exposed people to hydrologic hazards such as flooding or tsunamis; or adversely affected surface water or groundwater quality or quantity. Impacts would also be considered significant if existing drainage patterns of the site or area would be substantially altered.

#### **4.15.1 Proposed Action**

##### **4.15.1.1 Short-Term Impacts**

Short-term impacts associated with the Proposed Action are related to the construction of the proposed drainage improvements. Potential pollutants from construction-related activities include sediment and hazardous materials such as vehicle and equipment fluids. The area of soil disturbance during construction of the Proposed Action would be less than 1 acre; therefore, construction activities would not require coverage under a NPDES General Permit Storm Water Discharges Associated with Construction Activities and a SWPPP would not be required. Nevertheless, implementation of the BMPs listed in measure WATER-1 in Section 4.15.4 below, including erosion and sediment controls, good housekeeping practices, and spill prevention and control, would be implemented to reduce or eliminate water quality impacts during construction. Therefore, construction impacts on water quality would be less than significant.

Pillar Point AFS is not located within a 100-year floodplain, tsunami run-up area, or tidal flood hazard area. Therefore, the Proposed Action would have no water hazard impact.

Pillar Point AFS is isolated from inland groundwater basins due to the San Gregorio fault which forms a hydrogeologic barrier and water-bearing formations at Pillar Point AFS are deep enough that they would not be directly affected by the Proposed Action (Fugro 1999). Therefore, construction of the Proposed Action would no impact on groundwater resources.

##### **4.15.1.2 Long-Term Impacts**

Storm water quality modeling was conducted for the Proposed Action using a continuous flow hydrologic model based on 10 years of historical rainfall data and 12 months of metered flow data to help refine the low-impact development design and to determine potential reductions in storm water volume and pollutant load for the Proposed Action. The methods and results of the modeling effort are contained in a water quality modeling report prepared for the proposed project (Tetra Tech 2009b 2010b).

The results of the modeling indicate that designing the proposed bioretention cells at a depth of 30 to 36 inches would result in an 80 percent reduction in the storm water volume discharged to the ASBS based upon rainwater infiltration capabilities evaluated, and the recorded runoff volumes. In addition, although the majority of the associated pollutant load removal would be attributed to the volume reduction, removal of TSS (a proxy for other pollutants) is estimated at 85 percent due to the additional solids that would settle out in the bioretention cells.

The estimated performance of the bioretention cells meets the performance goal of an 80 percent annual capture rate for low-impact development BMPs adopted by the California Storm Water Quality Task Force and Water Environment Federation/American Society of Civil Engineers in their jointly published *Urban Runoff Quality Management* (Roesner 1998) as well as in the California Stormwater Quality Association's (CASQA's) *Storm Water Best Management Practices Handbook* (CASQA 2003). In addition, Table 4-5 shows what pollutant concentrations would be at the ASBS with an 85 percent reduction in each pollutant concentration. As shown in Table 4-5, the expected residual pollutant concentrations at the ASBS would be below the COP water quality objectives.

**Table 4-5**  
**Target Storm Water Pollutant Concentrations at the ASBS under the Proposed Action**

Analyte	Units	California Ocean Plan Water Quality Objectives <sup>1</sup>					Expected Concentrations at ASBS
		Instantaneous Maximum	1 Day Maximum	7 Day Average	30 Day Average	6 Month Median	
Arsenic	µg/L	80	32	--	--	8	5.12
Beryllium	µg/L	--	--	--	0.033	--	ND
Cadmium	µg/L	10	4	--	--	1	ND
Chromium, Total <sup>2</sup>	µg/L	20	8	--	--	2	ND
Coliform, Total		400	--	--	--	--	<2
Copper	µg/L	30	12	--	--	3	1.3
<i>Enterococci</i>		104	--	--	--	--	0.3
Lead	µg/L	20	8	--	--	2	0.022
Mercury	µg/L	0.4	0.16	--	--	0.04	0.0354
Nickel	µg/L	50	20	--	--	5	2.5
Nitrogen, Ammonia	µg/L	6,000	2,400	--	--	600	ND
Selenium	µg/L	150	60	--	--	15	3.6
Turbidity	NTU	225	--	100	75	--	0
Zinc	µg/L	200	80	--	--	20	7.4

**Notes:**

<sup>1</sup>California Ocean Plan Tables A and B

<sup>2</sup>Chromium VI (hexavalent) limitations are used for Chromium, Total comparison

-- No applicable standard

µg/L micrograms per liter

ND not detected

NTU nephelometric turbidity units

Therefore, with implementation of regular maintenance of the new bioretention cells required in measure WATER-2 in Section 4.15.4 below, as well as regular monitoring of the storm water discharges into the ASBS as required in measure WATER-3 below, long-term water quality impacts would be less than significant under the Proposed Action.

The proposed bioretention cells would increase infiltration of storm water that could reach perched groundwater at Pillar Point AFS. However, storm water would be treated through plant uptake and adsorption to soil. Therefore, pollutants are not expected to reach the groundwater and impacts on groundwater would be less than significant.

### 4.15.2 Alternative 1

#### 4.15.2.1 Short-Term Impacts

Potential construction impacts on storm water quality under Alternative 1 would be slightly greater than impacts under the Proposed Action given the additional repairs needed to the asphalt and concrete channel along West Point Avenue and the culvert leading to the east end of Princeton Marsh. Similar to the Proposed Action, no water hazard impacts or impacts to groundwater resources would occur under Alternative 1. As under the Proposed Action, implementation of measure WATER-1 would ensure that construction impacts on storm water quality would be less than significant.

#### 4.15.2.2 Long-Term Impacts

Under Alternative 1, storm water discharges into the ASBS would be eliminated and instead routed to Princeton Marsh. The storm water pollutant load would be reduced by at least 85 percent from the bioretention cells. Storm water which does not infiltrate into the constructed bioretention cells would be conveyed to Princeton Marsh under Alternative 1. It is anticipated Princeton Marsh will further absorb and treat the remainder of the storm water before it reaches Pillar Point Harbor. Therefore, Alternative 1 could result in cleaner storm water discharged to the Pacific Ocean than under the Proposed Action. In addition, because pollutant loads are anticipated to be below the marine water quality objectives (as described in Table 4-5), residual pollutant concentrations would have a less than significant impact on the brackish marsh itself.

Alternative 1 would result in an increase in the rate and volume of storm water discharged to Princeton Marsh which could subsequently result in a change in the conductivity of Princeton Marsh and/or could change the hydraulics within the marsh. Overall impacts on the balance of freshwater and saltwater in the brackish marsh ecosystem could be adverse or beneficial depending on the nature of the changes to the ecosystem. Therefore, while Alternative 1 would have greater benefits to ocean water quality than the Proposed Action, long-term impacts on the balance of freshwater and saltwater in the brackish marsh are unknown and would require further study.

#### 4.15.3 No-Action Alternative

Under the No-Action Alternative, storm water discharges into the ASBS would continue. The storm water discharge could result in deleterious effects on marine life that occur offshore of the storm water outfall. Therefore, impacts on water quality would be greater than under the Proposed Action and Alternative 1.

#### 4.15.4 Best Management Practices

**WATER-1.** The following BMPs will be incorporated into an Erosion and Sediment Control Plan and implemented during construction to minimize erosion:

- a. Methods such as geotextile fabrics, erosion control blankets, drainage diversion structures, and/or siltation basins will be used to reduce erosion and siltation into storm drains during grading and construction activities.
- b. All entrances/exits to the construction site will be stabilized (e.g. using rumble plates, gravel beds or other best available technology) to reduce transport of sediment off-site. Any sediment or other materials tracked off-site will be removed within a reasonable time after they are tracked when feasible.
- c. Storm drain inlets will be protected from sediment-laden waters by the use of inlet protection devices such as gravel bag barriers, filter fabric fences, block and gravel filters, and excavated inlet sediment traps.
- d. Construction staging and storage areas will be shown on project plans.
- e. Erosion and sediment control measures will be in place throughout grading and development of the site until all disturbed areas are permanently stabilized.

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- f. Construction materials and waste such as mortar, concrete slurry, fuels, etc. will be stored, handled, and disposed of in a manner that minimizes the potential for storm water contamination. Bulk storage locations for construction materials and any measures proposed to contain the materials will be shown on project plans.
- g. A copy of the Erosion and Sediment Control Plan will be maintained on the project site during grading and construction activities.

**WATER-2.** All proposed and completed new storm water infrastructure will be inspected prior to the rainy season and maintained as detailed below:

- b. Plantings in the bioretention cells will be monitored and maintained for three years following installation to ensure proper establishment. During this time, the Air Force will maintain a native plant coverage at a minimum of 70 percent in the bioretention cells; should this criteria not be met, the Air Force will install replacement plantings. Plants will be watered by hand every two to three days for the first two months following installation (unless these waterings can be supplemented by rainfall), and then on an as needed basis for the remaining three years to ensure proper establishment of the plants.

During the year of installation (year 0) and three years following installation (years 1, 2, and 3), the Air Force will perform three monitoring events per year during the spring. Field data collected during the monitoring events will include, but not be limited to:

- Number and condition of container plants;
- Evidence of reproduction (flowers, fruits etc);
- Percent cover of native species;
- Number and percent of invasive species;
- Information regarding the need to weed and water the site;
- Notes on precipitation and the water level within the bioretention cells; and
- Photographs from established photo points.

The Air Force will prepare annual monitoring reports to document the results of the monitoring efforts.

- c. Invasive plant species will be removed from the bioretention cells on an annual basis as needed to maintain invasive plant species cover at trace levels (<1 percent cover) within the bioretention cells.
- d. Mulch will be replaced in the bioretention cells every two to five years to promote the uptake of heavy metals.
- e. The inlets, ponding and surface overflow areas, and underdrains of the bioretention cells, as well as the outfall at the ocean, will be inspected on an annual basis after the first storm of the season and then monthly during the rainy season to check for sediment accumulation and erosion. Any accumulated sediment or material that impedes flow into or out of the bioretention areas will be removed and properly disposed of. Signs of erosion will be addressed immediately by installation of erosion control BMPs and re-evaluation of the design of the LID system will be conducted to prevent any long-term erosion issues.

**WATER-3.** If the State Water Resources Control Board grants a General Exception to the California Ocean Plan prohibition of storm water discharges from Pillar Point AFS into an Area of Special Biological Significance, regular monitoring of the storm water discharges into the Area of Special Biological Significance will be conducted as required by the Special Protections monitoring requirements of the General Exception.

#### **4.16 CUMULATIVE IMPACTS**

The CEQ regulations define “cumulative impact” as the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

##### **4.16.1 Past, Present, and Reasonably Foreseeable Actions in the Region of Influence**

Other construction projects scheduled on Pillar Point AFS in the foreseeable future include replacement of the underground storage tanks (USTs) (Rudd 2009), replacement of a cliff side septic tank and leachfield, and ongoing minor maintenance of the facilities. The County of San Mateo is currently processing a permit application for an office park and wellness center called the Big Wave Project that would be located immediately to the northeast of the proposed project, in two agricultural fields located between Princeton Marsh and the Half Moon Bay Municipal Airport. In addition, several residential and commercial developments can be expected to be ongoing during construction of the proposed project in the surrounding communities of El Granada, Moss Beach, Montana, Miramar, and Princeton-by-the Sea.

##### **4.16.2 Proposed Action**

Over the short-term, construction of the Proposed Action would contribute to cumulative air quality impacts in the region through fugitive dust emissions and would contribute to cumulative traffic impacts in the region through the generation of construction traffic. However, with implementation of standard dust control measures, the Proposed Action would not have a considerable contribution to cumulative air impacts. In addition, because the Proposed Action would only require a small number of workers over the four month project and the export of only 2,500 CY of soil, the Proposed Action would not have a considerable contribution to cumulative traffic impacts in the region. Therefore, cumulative impacts would be less than significant.

Over the long-term, the Proposed Action is expected to reduce pollutant loads discharged to the Pacific Ocean to levels below COP water quality objectives. Therefore, the Proposed Action would not have a considerable contribution to cumulative water quality impacts on the ASBS.

##### **4.16.3 Alternative 1**

Alternative 1 would have potentially significant impacts on cultural resources which could result in a considerable contribution to cumulative impacts depending on the significance of the archaeological resources disturbed.

Over the short-term during construction, Alternative 1 would have greater potential impacts on special-status plant and wildlife species and on wetlands. However, restoration and biological monitoring would ensure that Alternative 1 would not have a considerable contribution to cumulative impacts on sensitive

## **4.0 Environmental Consequences**

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natural resources. In addition, over the long-term, although Alternative 1 would reduce pollutant loads discharged to the ocean.

Alternative 1 would have unknown effects on the conductivity and hydraulics of Princeton Marsh, and therefore, would warrant further study to determine if it would have a considerable contribution to cumulative impacts on the marsh.

### **4.16.4 No-Action Alternative**

Pollutant discharges to the ASBS would continue under the No-Action Alternative. The storm water discharge could result in deleterious effects on marine life that occur offshore of the storm water outfall. Therefore, the No-Action Alternative could potentially have a considerable contribution to water quality impacts on the ASBS.

## **4.17 UNAVOIDABLE ADVERSE IMPACTS**

Unavoidable adverse impacts include those impacts that are negative, occurring regardless of any identified minimization measures. The Proposed Action would not result in unavoidable adverse impacts. BMPs will be implemented to reduce impacts to all resources to less than significant levels.

## **4.18 SHORT-TERM VERSUS LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT**

Examples of short-term uses of the environment include direct, construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period typically less than 5 years. Long-term uses of the environment include impacts occurring over a period of time of more than 5 years, including permanent resource loss.

The Proposed Action is designed to improve the long-term productivity of the environment through improved water quality. In addition, short-term impacts would be reduced to less than significant levels through implementation of BMPs.

## **4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Irreversible and irretrievable resource commitments are related to the use of nonrenewable natural resources and the effects that the use of those resources will have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy or minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of implementing an action (e.g., extinction of a rare or threatened species, or the disturbance of an important cultural resource site). In accordance with NEPA (40 CFR 1502.16), this section includes a discussion of any irreversible and irretrievable commitment of resources associated with the Proposed Action.

Construction of the Proposed Action would use minimal energy resources to complete the project and therefore, would not result in an irreversible and irretrievable commitment of resources.

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## 8.0 ACRONYMS AND ABBREVIATIONS

30 CES/CEAN	30 <sup>th</sup> Space Wing's Natural Resources Management Section
30 CES/CEANC	Environmental Conservation
30 CES/CEANQ	Environmental Quality
AB	Assembly Bill
ACM	asbestos-containing material
AFB	Air Force Base
AFI	Air Force Instruction
AFS	Air Force Station
AOC	area of concern
ASBS	Area of Special Biological Significance
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BMP	best management practice
C&D	construction and demolition
Cal OSHA	California Occupational Safety and Health Administration
CASQA	California Stormwater Quality Association
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Restoration, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Department of Fish and Game Natural Diversity Data Base
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO <sub>2</sub> e	carbon dioxide equivalent
COP	California Ocean Plan
CSC	species of special concern
CWA	Clean Water Act
CY	cubic yards
CZMA	Coastal Zone Management Act
dBA	A-weighted decibel(s)
dBC	C-weighted decibel(s)
DoD	Department of Defense
DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ESA	Endangered Species Act

## **8.0 Acronyms and Abbreviations**

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FE	federally endangered
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
g/m <sup>3</sup>	grams per cubic meter
HWMP	Hazardous Waste Management Plan
Hz	Hertz, cycles per second
ICBM	intercontinental ballistic missile
LBP	lead-based paint
LBMPM	Lead Based Paint Management Plan
lbs/day	pounds per day
Ldn	day-night noise level
Leq	long-term equivalent A-weighted sound level
LID	Low Impact Development
MMPA	Marine Mammal Protection Act
mph	miles per hour
MS4	municipal separate storm sewer system
MT	million tons
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO <sub>x</sub>	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PL	public law
PM <sub>2.5</sub>	particulate matter 2.5 microns or less in diameter
PM <sub>10</sub>	particulate matter 10 microns or less in diameter
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
SAIC	Science Applications International Corporation
SFBAAB	San Francisco Bay Area Air Basin
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SWRCB	State Water Resources Control Board

TCM	Transportation Control Measure
TSS	total suspended solids
U.S.	United States
U.S. EPA	United States Environmental Protection Agency
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WRLISSHD	Western Range Landbased Instrumentation Support Systems Historic District

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